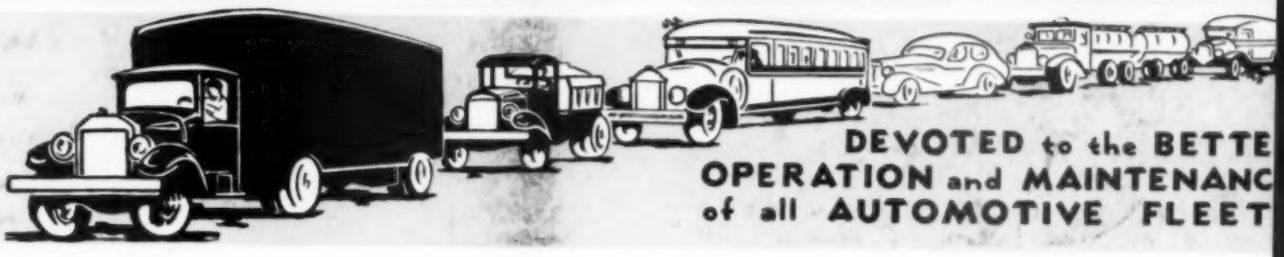
TECHNOLOGY DEPT.
First Copy
NOV 9
DETROIT

FLEET OWNER

VEMBER
1935



DEVOTED to the BETTE
OPERATION and MAINTENANC
of all AUTOMOTIVE FLEET

FEATURES IN THIS ISSUE:

Diesel Engine Details
(Automotive)

How Preventive Maintenance Pays
J. M. Barkley

Forty Friendly Drivers Help to Reduce Costs
A. Maintenance Mann

How 87 Fleets Buy and Service Air-Cleaners
H. Clay Fischer

Experience With Self-Insurance
S. D. McMurray

Choosing Brake Lining
Roy Berg

EPARTMENTS: QUESTION-OF-THE-MONTH • NEW MODELS
OHN-LAW SEZ • NEWS OF THE TRUCK INDUSTRY

Prest-o-weld

THE DOUBLE-DUTY BLOWPIPE

saves time . . earns money

● The Prest-O-Weld Detachable Valve Body feature makes every blowpipe a *double-duty* blowpipe. You can switch from a large or small *welding* blowpipe to a *cutting* blowpipe or cutting attachment without a minute's delay—practically a non-stop operation without interruption of your work. It is not necessary to use a wrench or disconnect the hose.

Instead of buying four blowpipes, you buy one new-type Prest-O-Weld Blowpipe equipped with the detachable valve body. When more blowpipes are required, merely buy the handles. These cost less than complete blowpipes and one detachable valve body fits them all.

This exclusive Prest-O-Weld feature is important to the large shop as well as the small one. Rush jobs involving both welding and cutting or both light and heavy welding can be done as quickly as those involving only one type of work. This means time saved, orders saved—money earned!

Just ask your jobber to show you how the Prest-O-Weld Detachable Valve Body works.

PRODUCT OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

In Canada: Dominion Oxygen Co., Ltd., Toronto

PREST-O-WELD

WELDING AND CUTTING APPARATUS

10 Seconds is all you need to Change Blowpipes

● The Prest-O-Weld Detachable Valve Body feature of the Type W-106 Welding Blowpipe enables you to switch quickly to a larger blowpipe or to a cutting blowpipe or cutting attachment, without disconnecting the hose or using a wrench.

Prest-O-Weld Type W-106 Welding Blowpipe with 5 tips, lighter and wrench $21.00

Prest-O-Weld Type W-106 Handle Assembly (same as above but without valve body) $14.00

Prest-O-Weld Type CW-105 Cutting Attachment with No. 1 and 2 nozzles $21.00

Prices slightly higher west of Rocky Mountains

Nothing short of proved excellence can explain the world leadership of Champion Spark Plugs. Nothing short of proved performance can explain their use by practically all racing champions. Nothing short of Champion's Extra-Range and exclusive sillimanite insulators can result in the dependable low cost per mile service they assure.

NEW BRUNSWICK, N.J.—*A portion of the fleet of 40 trucks operated by the Middlesex Transportation Co. between New York and Philadelphia. This firm is a division of Johnson and Johnson, manufacturers of medical and toilet supplies, and has been a consistent user of Champions.*

OTTAWA, ONT.—*Colonial Coach Lines operate 30 modern, up-to-date coaches daily between Ottawa, Toronto, Montreal and Kingston. Like their affiliated company, Provincial Transport, they use Champion Spark Plugs for dependability and economy.*

KEEP ENGINES YOUNG • • • TEST AND CHANGE SPARK PLUGS AT REGULAR INTERVALS

For the MAN THE

Faster schedules with Texaco Fire-Chief

"Emergency" specifications are rigidly followed in refining "*Fire-Chief.*" Thorough laboratory tests are made constantly to assure uniformity. That's why Texaco *Fire-Chief* makes possible maximum power with a cooler engine, trigger-quick starts, and increased mileage.

Reduced maintenance with Texaco Marfak

Texaco Marfak is made of a heavier bodied mineral oil. It is highly adhesive and holds to all bearing surfaces. That's why it efficiently carries the heaviest loads, withstands shocks, and prolongs the life of wheel bearings, universals, shackles and steering connections.

Fewer pull-ins with Texaco Motor Oil

Texaco Motor Oil will give you a cleaner engine because it resists sludging and has an extremely low carbon-depositing tendency. Its cleanness and low pour point cause swift circulation which insures full protection to all moving parts at all times. It seals compression and maintains full power output from every cylinder.

TEXACO TEXACO *tested*

REFINERY TESTED FOR UNIFORMITY . .

who counts PROFITS

ASK A TEXACO REPRESENTATIVE about fuel efficiency and economy. Ask about "stepped up" engine performance and double mileage between chassis lubrications. Ask how you can get thousands of extra engine miles before carbon and valve jobs are necessary — how to minimize replacements and save maintenance costs. This friendly cooperation helps your men meet their problems in a way that's profitable to you.

THE TEXAS COMPANY

135 East 42nd Street · New York City

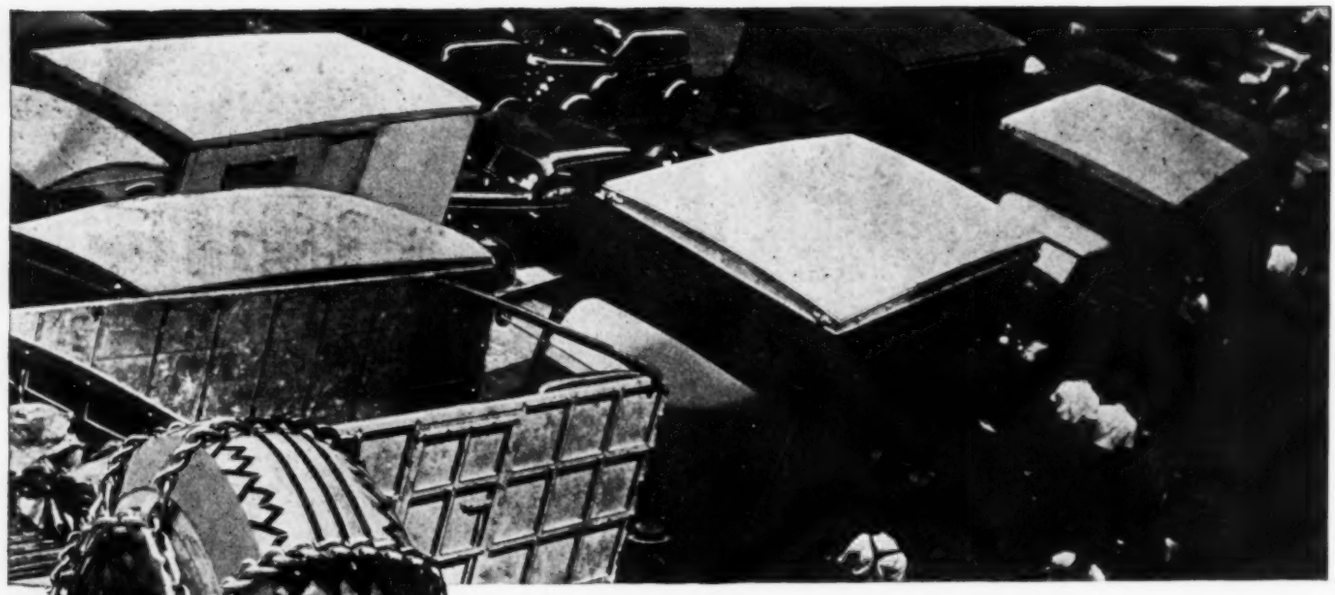
Nation-wide distribution facilities assure prompt delivery

LUBRICANTS

. . SERVICE TESTED FOR ECONOMY

KEEPING TRUCKS MOVING

isn't always a traffic problem!



Pyrene's patented lock snaps tight as a vise at fingertip touch, holds firmly in service—and even on the outer tire of big dual pneumatics, opens automatically, without tools, when tension is relieved.

Pyrene TIRE CHAINS *mean* TRACTION *insurance*

Traffic tie-ups cost little compared with winter road failures due to the lack of tire chains. Storm tie-ups of fleet operations are often the result of not being prepared. Don't lose productive truck-hours because chains are not a part of regular equipment. Don't jeopardize your business and lose profits by failing to make deliveries—and to make them on time.

Pyrene long-life tire chains with their armored surface and pliable core provide heavy-duty traction and prevent skidding.

Your investment in a reserve stock of tire chains need not be large if you rely on local Pyrene stocks. Pyrene warehouses and jobbers throughout the country maintain a stock of the sizes you need. Decide today to be prepared for winter's emergencies. Tell us the number of vehicles you operate, and the chain sizes you use, and we will tell you where to get them. A post card to Pyrene will bring you the address of our local warehouse.

Pyrene TIRE CHAINS

Pyrene Manufacturing Company
NEWARK NEW JERSEY
ATLANTA KANSAS CITY CHICAGO SAN FRANCISCO

. . . that's a *lot* of automotive cable, but Packard has produced that much and more. Packard leads as the world's oldest and largest maker of automotive cable of all types. But Packard is not known merely for the quantity of cable it produces. Packard *quality* has been a by-word in the automotive industry and trade during all of Packard's thirty-five years of manufacturing. Packard has progressed with the industry—introducing valuable innovations in cable design, packaging and merchandising. When you think of automotive cable, think of Packard.

Packard Electric Corporation, Warren, Ohio.

Packard

REG. U. S. PAT. OFF. TRADE MARK

THE STANDARD WIRING EQUIPMENT OF THE AUTOMOTIVE INDUSTRY

SAVE MONEY THESE FOUR WAYS

TODAY economy counts. Even a maintenance saving of a fraction of a cent a truck mile amounts to a surprisingly large sum during a year's operation.

Here are four proven ways that will help you establish real dollars and cents savings on maintenance cleaning and other work by using Oakite materials.

1. CLEANING PARTS BEFORE OVERHAUL

Large or small parts are soaked CLEAN in record time! Dirt-free and ready for shopmen. No scraping. Inspection more accurate.

2. STRIPPING BEFORE REPAINTING

Spray on Oakite Cold-Strip . . . let soak . . . then rinse. Each application will remove two to four old paint coats. Strips paint and synthetic lacquers in half the time.

3. WASHING TRUCKS

Use SAFE Oakite materials to remove traffic film and dirt from interior and exterior surfaces. Saves time . . . less effort required . . . no streaky surfaces

4. WASHING FLOORS

Muck and grease covered concrete floors can be cleaned quickly, thoroughly, at low cost. No fire or explosion hazard. Rinsing easy.

Write for FREE BOOKLET!

Tells how many fleet operators prepare trucks for winter operation. Gladly mailed on request.

Manufactured only by

OAKITE PRODUCTS, INC.

52G Thames St., NEW YORK, N. Y.

Branch Offices and Representatives in all Principal Cities of the U. S.

OAKITE

TRADE MARK REG. U.S. PAT. OFF.

Industrial Cleaning Materials and Methods

The

FLEET OWNER

Published Monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops and devoted to the better Operation and Maintenance of Truck, Trailer, Bus, Passenger Car, Taxicab and all Automotive Fleets.

VOL. 15 New York, November, 1935 No. 5

Table of Contents

Stripping the Thread	Editorials	13
Preventive Maintenance Pays	J. M. Barkley	16
Friendly Drivers Cut Costs	A. Maintenance Mann	22
Experience With Self-Insurance	S. D. McMurray	25
News of the Truck Industry		26
Diesel Engine Specifications		27
Cummins Diesel Engines		28
Buda Diesel Engines		30
Hercules Diesel Engines		32
Waukesha Diesel Engines		34
How 87 Fleets Buy Air Cleaners	H. Clay Fischer	35
Choosing Friction Materials	Roy Berg	40
Why Your Dollar Buys More Truck	E. W. Winans	44
Letters to the Editor		46
Ford Announces 1936 Trucks and Commercials		49
New Trade Literature Offerings		50
Studebaker's "Cab Forward" Models		51
Question-of-the-Month Club		52
New Products for Road and Shop		54
What Operators Are Doing Everywhere		58
Here and There in the Truck Industry		60
John Law Sez (Legal Information)		61
Index to Advertisements		74

Published Monthly by

The FERGUSON PUBLISHING COMPANY

90 West Street, New York City

E. F. Ferguson, President

A. L. Conley, Gen. Mgr. and Treas. — Henry Clay Fischer, Editor

ADVERTISING DEPARTMENT:

Eastern Mgr.: Hal. H. Clark, 90 West St., New York, Tel. REctor 2-9179
Cleveland-Detroit Mgr.: L. W. Perkins, 3260 Elsmere Rd., Cleveland, Tel. Longacre 2718
Chicago Mgr.: D. B. Trott, 5820 Kenmore Ave., Tel. Long Beach 2331
West Coast Rep.: R. H. Deibler, 1406 So. Grand Ave., Los Angeles, Tel. Richmond 5274

CIRCULATION SUPERVISOR:
J. Hayes Fuller

Subscription: $2.00 Yearly; Single Copies 25c

CCA

(Copyright 1935 by the Ferguson Publishing Company)

Costs less to own for 3 provable reasons

The GMC 1½-2 ton truck—the truck of value with 47 important quality features—costs less to run for three definite reasons. Owners have proved it and logic confirms it.

1. DOES MORE WORK—Vital superiorities, such as greater payload capacity, higher sustained engine torque, greater horsepower, less deadweight and many other features of design, naturally assure more work per day and per year—enable owners to make greater profits.

2. NEEDS LESS UPKEEP—because of such superiorities as economical 6-cylinder engine, with its many features that contribute to long life; needle bearing universals; full floating rear axle with straddle-mounted pinion; hydraulic brakes with centrifuse drums and quality linings of large area.

3. OPERATES AT LOWER COST—Fuel is more effectively utilized; electro-plated semi-steel pistons provide a more effective seal against oil loss; Spoksteel wheels contribute to longer tire life; GMR combustion chamber provides high compression performance with ordinary fuels.

Your nearest GMC branch, distributor or dealer has the detailed bedrock facts!

SENSATIONAL SAVINGS!

GMC Dual Performance now available in 1½-2 ton range saves 22,680,000 motor revolutions per truck per year. Exceptional economy and more work in less time. Ask about it!

GENERAL MOTORS TRUCKS and TRAILERS

1½-22 TONS

THE TRUCK GMC OF VALUE

Time Payments Available Through Our Own Y. M. A. C.

GENERAL MOTORS TRUCK COMPANY, PONTIAC, MICHIGAN

NEW WHITES BIGGEST FIRST MONTH

OPERATORS ENTHUSIASTICALLY WELCOME NEW STREAMLINED WHITES AS GREATEST TRUCK DOLLAR VALUE ON MARKET

● Daily production schedules doubled . . .

Factory payroll at the highest point since 1929 . . .

The largest first month's production of new models in the history of White . . .

That's what we mean by operator reception of the new streamlined Whites which we believe has never been equalled in truck history.

Contract haulers, packers, dairies, oil companies, coal dealers, plumbing supplies, restaurants, department stores—as well as many miscellaneous lines—are included in the list of first orders—indicating the adaptability and immediate appeal of the new streamlined Whites to practically every kind of business.

There has been a crying need for a *quality* truck, designed for today's operating conditions, yet priced within reach of all. Operators have found it in the new Whites.

The new streamlined Whites are real *quality* trucks—all White built and engineered. Mechanically they are the greatest White trucks in 35 years. Safety in truck operation should be a paramount consideration today—and every mechanical unit in the new Whites has been weighed carefully from the standpoint of contributing to a greater

Above:

This new Model 704 tractor semi-trailer unit is one of an order for 27 similar units now being delivered. These Whites will be used by J. L. Keeshin, Chicago, in his Transcontinental Freight Lines—the first coast-to-coast trucking system—an outgrowth of Keeshin Motor Express Co., Chicago—and called "the largest one man controlled trucking operation in the world".

THE MOST ECONOMICAL TRUCK ENGINE EVER BUILT—

The new White-built and White-designed 80 H.P. engine is the most durable, economical truck engine built. It has a newly designed combustion chamber exclusive with White—four port intake manifold—White patented stellite screwed-in valve seats—seven bearing counterweighted crankshaft—unusually large high-precision steel backed engine bearings—positive lubrication under pressure, to all moving parts. The efficiency of this power plant is a big factor in making these new Whites the outstanding truck values today.

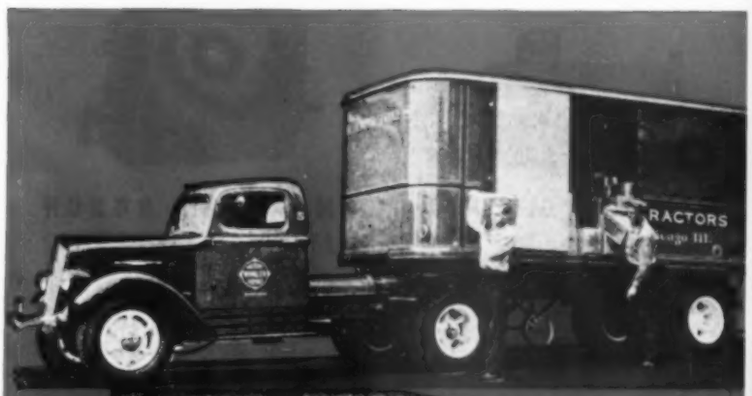
S BRING FACTORY
H ORDERS IN HISTORY!

factor of safety. The White built 270 cubic inch engine provides ample power for quick acceleration and flexibility in traffic. Four wheel booster operated hydraulic brakes assure vehicle control at all times. Automatic air conditioned cabs make possible constant circulation of fresh air for driver comfort and alertness. Styled by Alexis de Sakhnoffsky, the new streamlined Whites offer operators new advertising value—style—and beauty for their hauling equipment.

See the new Whites at your nearest White Factory Branch or Dealer or telephone for a demonstration. Liberal terms can be arranged. The Model 703 is priced at $1240, chassis at factory. A few desirable dealer franchise opportunities are still available.

Model 703 . . 1-1½ Tons Model 704 . . 1½-2 Tons
Model 704A . 2-3 Tons Model 709 . . 2½-3 Tons
Model 709A . . 3-4 Tons

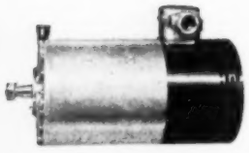
THE WHITE MOTOR COMPANY • CLEVELAND



THE NEW *White*

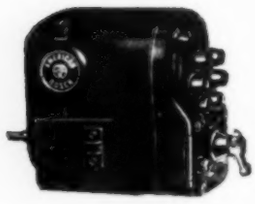
The Greatest White Truck in 35 Years

THESE *Famous* PRODUCTS LOWER BUS-MILE-COST



VOLT-O-MATIC GENERATOR

As the thermostat in a home adjusts the heat output to changes in temperature, so the Volt-O-matic Generator adjusts its charging rate to the needs of the vehicle; automatically increasing the charge when more current is needed or the battery is low and tapering it off as the load decreases or the battery becomes fully charged. The Volt-O-matic Generator is "kind to your battery" . . . easy on your pocketbook . . . and reduces battery maintenance cost. Obtainable in all sizes from 30 to 1000 watts output.



AMERICAN-BOSCH MJ SUPER-ENERGY MAGNETO

A new magneto of the stationary winding type providing performance at both low and high speeds that far surpasses present-day ignition requirements. Extreme ruggedness and unique construction create a new degree of simplicity in magneto maintenance. The MJ Super-Energy Magneto is a notable addition to the world-famous line of American-Bosch Magnetos.

PYRO-ACTION SPARK PLUG

(Built under license from the World's oldest Spark Plug Manufacturer.)

The new Pyro-Action Spark Plug with its new-type insulator, heavier electrodes, wider heat range, assures utmost efficiency with longer life. Typical service records: 70,000 miles, 54,000 miles, 59,000 miles. Pyro-Action Plugs are the crowning achievement of the world's oldest spark plug manufacturer. Made in all types and sizes to fit any engine.

VIBRO-BALANCED HORN

In actual service Vibro-Balanced Horns often outlive the vehicle. They hold their tone and do not require frequent adjustment. Quality-built in every particular and designed for the exacting service demands of buses. Obtainable in black enamel or chromium, with various mounting brackets.

NEVERSTALL WINDSHIELD WIPER

The Neverstall Windshield Wiper has a trouble-free, long-life electric motor that insures constant, uniform performance regardless of engine speeds. It is sturdily built to give years of dependable . . . safe . . . there-when-you-want-it service. For safety's sake use Neverstall Windshield Wipers.

DITCH *and* FOG LIGHT

The Ditch and Fog Light with its Triple Beam spreads a semi-circle of safety around the front of the bus. Removes the danger and strain of night driving; helps to make night schedules as certain as daytime runs. Its triple amber beam penetrates fog and mist, reveals all of the road and eliminates dangerous back-glare.

"MANY Volt-O-matic Generators have covered 150,000 miles without receiving any attention."

"All 12 of the original Pyro-Action Spark Plugs were still in the engine after 70,122 miles."

"The Vibro-Balanced Horn b-e-e-ped 201,000 times and was still going strong when it was removed from the automatic testing device."

* * *

Evidence like this is taken direct from the maintenance records of leading bus and truck fleets. What does it mean to you? Schedules maintained. Lay-ups avoided. Road breakdowns averted. Lower cost per bus mile—by the use of dependable Bosch and American-Bosch equipment.

Described here are a few of these outstanding products. Near you is a distributor who will be glad to cooperate in testing these products in your fleet. Thus you can prove to yourself how they can save money *for you* — minimize road breakdowns . . . reduce idling time.

Behind these products stands a nation-wide service organization ready for emergency assistance in repairs...quick service in replacement parts... ever-ready help on any maintenance problem.

Full information will be supplied gladly upon request.

We have always taken pride in creating, designing, building and selling products superior to those commonly in use. Built to a high standard of quality, our products are proven leaders in their fields.

AMERICAN-BOSCH BIG BRUTE COIL

Especially designed and ruggedly built, for bus and truck service. It has ample reserve power that insures efficient ignition at all operating speeds, all load conditions—all heavy duty extra-strenuous service.

Especially valuable to companies operating fleets of passenger cars is the American-Bosch "Two-for-All" Coil Kit. It contains two American-Bosch Safety Coils (6-volt) which with a few simple fittings and brackets contained in the kit, take the place of the 60 or more types of coils formerly required to serve most passenger cars on the road as well as many types of light delivery trucks.

UNITED AMERICAN BOSCH CORPORATION

SPRINGFIELD, MASS.

VOL. 15
NO. 5

FLEET OWNER

NOVEMBER
1935

DEVOTED TO THE BETTER OPERATION AND MAINTENANCE OF TRUCK, TRAILER, BUS, TAXICAB, PASSENGER CAR, AND ALL AUTOMOTIVE FLEETS.

Stripping *the* Thread » »

(The Editor's Column)

DOPE ON DIESELS

● "All we know is what the other feller tells us!". . . . In so many words we want to pass the buck to the various Diesel engine manufacturers, who furnished the data comprising our "Diesel Encyclopedia" which appears on pages 27 to 34 of this issue. . . . Who asked for it? . . . . You did. . . . Everywhere your Editor went, the boys would say, "How about some dope on Diesels, Clay?" . . . . So there it is. . . . Diesel engines for trucks and buses seems to be the topic of conversation wherever fleet men meet. Everybody is talking about them, speculating and wondering. But no truck publication utters a peep as to what they are all about. . . . So it behooves your favorite publication (the pioneer, incidentally) to give you the dope, direct from Diesel headquarters—and something else besides a few fancy pictures and the bore and stroke. . . . In this presentation we have tried to give you a panoramic picture of all of the *automotive* Diesel engines that are now available, either for installation in new trucks, or as replacements in old ones. . . . Much in the way of midnight oil (non-alcoholic), air-mail letters and telegrams, was consumed in order to gather the data which this "encyclopedia" covers. . . . We have tried to hand it out to you in a fair and impartial manner, omitting all of the fancy claims and comparisons, and sticking to the basic facts and details. . . . If you'd like further details and an installation diagram of any of the Diesels mentioned, just ask Brother Fischer for it. . . . Our next job on Diesels (other publications please copy) is a first-hand article, with facts, figures and not-so-fancy pictures, from an operator who has had *real* success with Diesel engines. . . . You'll be looking for it, won't you?

FASHION NOTE

● Here's what the sensibly-dressed automotive engineer will wear this winter, especially when he's on the job in "cold-storage" laboratories, such as this one. . . . The picture was taken outside the glass window of The Electric Storage Battery Company's "cold room", recently completed to enable the Exide engineering staff to determine the starting problems of Diesel engines at various temperatures and under varying conditions. . . . So, if you have joined the Diesel ranks, and should encounter starting difficulties this Winter, there's *one* battery manufacturer who ought to be able to help you out. . . .

Just in case you are interested, the temperature in the room at the time the above picture was taken was 20 degrees below zero. . . . And the informal character of this department gives us this opportunity of presenting a publicity item that would otherwise find its way into our waste-basket, for want of a better place to put it. . . . P. S.—Exide's address is Philadelphia, Pa.

●

GLAD TO SEE YOU!

● That old popular ditty, "Let a Little Pleasure Interfere With Business" is brought to mind this month with the staging of the Joint Automotive Service Industries Show, by the leading trade organizations of the automotive industry's after-market. . . . The Show, which promises to be the "biggest ever", will be held in the Atlantic City Auditorium, during the week of December 9 to 13. . . . Of pertinent interest to fleet maintenance men, of course, will be the "Trade Night," scheduled for Friday evening, December 13th, when the doors will be thrown open to bus, truck and taxicab operators and their maintenance men. Admission will be by special tickets, which are now being distributed by jobber members of the two associations located within an approximate radius of two hundred miles from Atlantic City. The tickets are free, of course. . . . Trade night gives the fleet maintenance man a splendid opportunity to comprehend the size of the vast industry of which he is a part. It is of practical value to him in that it is his one opportunity to view the latest developments in shop equipment, labor-saving tools and other supplies, and to compare competitive products, side by side. Needless to say, many new lines are announced for the first time, at this major annual event. . . . If you are located reasonably near to this popular coast resort, why not get in touch with your jobber for a pair of "Annie Oakleys"? This is a good time to relax for a few days, relieve your mind from the cares of routine business, and combine "a little pleasure

(*Please turn over*)

●

H. Clay Fischer
Editor

●

YOU SEE IT "FIRST" IN FLEET OWNER

The Editor's Column » »

(Continued from Page 13)

with business." And don't fail to look us up. We'll be there, at Booth 1060, and shall be glad to clasp your hand. . . . P.S.—If you'd like a supply of tickets, and have any difficulty in getting them, drop us a line, and we'll be glad to oblige. . . . As always.

•

"I DRIVE SAFELY"

● You may have seen many safety manuals, but we'll wager that you haven't seen anything as thorough and elaborate as the new one just brought out by International Harvester. . . . This one is a 64-page, pocket-size book, entitled "I Drive Safely" that is primarily intended for drivers of trucks and buses. . . . Just take a look at the contents: Speed, Brakes, Hilly Roads, Carbon Monoxide, Rules of the Road, Railroad Crossings, Safety Loading Factors, Steering, Tires, Lubrication, Mechanical Equipment, Lights, Pedestrians, Slippery Roads, Congested Traffic and Accident Hazards in the Shop. . . . It is attractive both typographically and from the illustration standpoint. . . . And it's for free distribution to truck and bus operators, everywhere. There isn't a line of advertising in it. . . . Before the supply runs out, better write Brother Fischer today and tell him how many copies you can put to good use. . . . We'll do our best to see that they are sent to you promptly and free.

•

WE SERVE AGAIN

● From time to time we feature the experiences of a fleet that has established a worth-while safety record. In addition to being "news", we feel that this type of editorial material will serve as somewhat of an incentive to other fleet operators to go out and do the same thing—or better. . . . When we published a story of this kind recently, we had no idea that the story itself would become valuable "evidence" of safe and successful operation and would be presented before old John Law himself. . . . It so happened that the fleet in question, a common and contract carrier, had applied for a renewal or extension of its intrastate franchise. The matter was brought before the "Commission" of that particular state, and, of course, there were plenty of "objectors" to the issuance of such franchise. . . . At the hearing, we are told, there were several gentlemen of the bar (lawyers, not bartenders) and each of them represented some railroad or competitive motor-carrier. . . . Furthermore, each of the legal solons was equipped with a copy of FLEET OWNER—the same one which carried the "safety story" of the fleet whose franchise extension hung in the balance. . . . To make a long story short, when the question of safe-and-sane operation was brought up, one of the lawyers was seen to wave his copy of FLEET OWNER, we are told, which presumably was the signal for the others to "waive" the question of safe highway operation. . . . Needless to state, one full day's testimony was thereby saved, at least, and a new use for your favorite publication was thus born. . . . P.S. Our operator friend renewed his franchise without difficulty.

•

FOR FIGURE SHARKS ONLY

● Slide-rule pushers should be extremely enthusiastic about this queer-looking contrivance, which is not unlike an exaggerated rolling-pin, for, believe it or don't, it's a slide-rule. . . . Automobile factories are "big operators" and their doings in the way of production and sales must be recorded, interpreted and compared with the factory's own former activities, as well as with the current achievements of competitors.

. . . For Dodge, this work is being done by O. E. Hagemeyer, who is shown here with *his* slide-rule. . . . With it, "Hagy" can do more percentage and other figuring in a minute, than even Professor Einstein could manage, without such aid, in several hours of concentrated mathematical efforts. . . . We don't know who made the device, or how much it costs, but if you're interested in it, perhaps "Hagy" will let you in on the details.

KNOWS WHEREOF HE SPEAKS

● An editorial writer on the *Atlanta Constitution*, thinking clearly, gave form on a recent summer's day to the following paragraph: *"Passed with proper caution there is little danger from the generally well-conditioned and expertly driven 'juggernauts.' They put a premium on the careful driving of smaller cars and perhaps add to the strain of their operation, but that is no reason why, as is so frequently the case, the chief blame for the peril of the highways should be laid to these carriers that have become an important and necessary part of the transportation system of the country."* . . . The thoughts expressed in that paragraph are marked by a calmness and fairness that well might be sought by many commentators whose words are far less convincing, *Highway Highlights* remarks. . . . As we would put it, "There is a fellow who knows what he's talking about!"

•

THE SINCEREST FORM?

● It has been said that imitation is the sincerest form of flattery. . . . So, we are duly flattered to observe that our Question-of-the-Month Club is being imitated. . . . Of course, we are glad to see fleet men participate in a worthy cause, regardless of who is sponsoring it. . . . But we want to let *everybody* know that we originated the idea in fleet publications, and regardless of how anyone else conducts it, it's still the imitation, the genuine being found between the covers of FLEET OWNER. . . . And if you'd like to have a tabulated report covering any of the subjects that we have taken up during the last seven years, just name your subject, and the chances are that we'll have a nice mimeographed report for you. . . . The cost? Nothing. . . . Just keep on participating in FLEET OWNER's Question-of-the-Month Club, and we'll call it square.

•

WEBSTER GOES MODERN?

● Here is a brand-new (to us) definition of the word "engineer". . . . An engineer, says the *Aluminum News Letter*, is a man who can build for $1.00, what any chump can build for $2.00.

60,000 MILES *with* ECONOMY *as a Passenger*

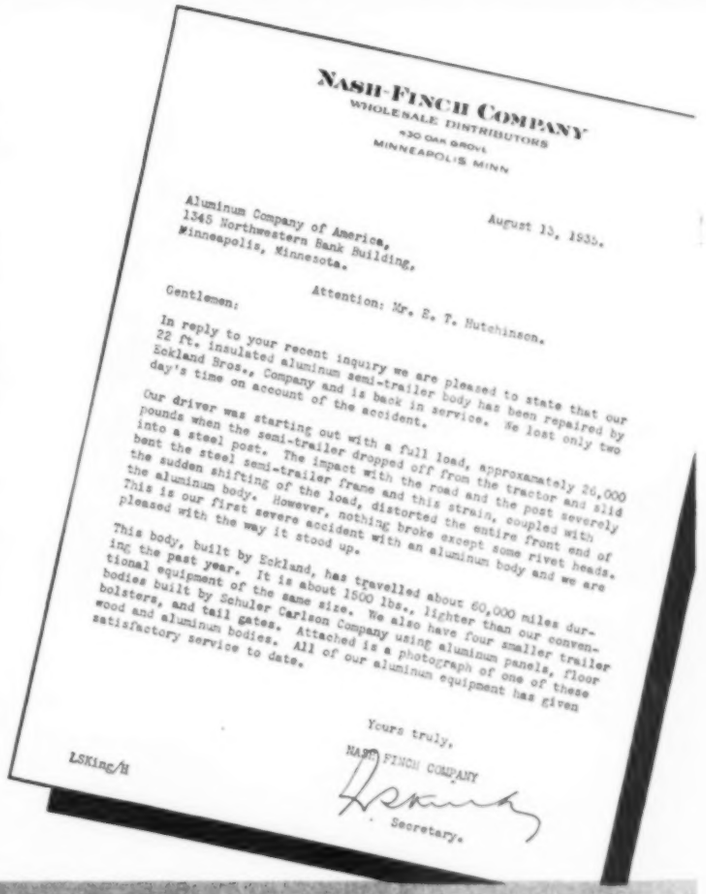
and RUGGEDNESS *as a member of the crew*

● 60,000 miles, for the year, with ECONOMY as a passenger is what this Aluminum Semi-trailer body has meant for the Nash-Finch Company. Traveling empty, a weight-saving of 1,500 pounds is made. Loaded, it can carry 1,500 pounds extra pay load.

And both the operator and the builder found the answer to this question: "What happens when an Aluminum Body meets with an accident?" Read the letter opposite. The body builders, Eckland Brothers Company, who handled the repair work, add this evidence of the fact that *Aluminum bodies will stand a lot of punishment.*

"Although the whole front end of the body was bulged, including the front roof sheet, the only parts replaced were the rivets. It is quite probable that the front posts and roof would have been broken off had the body been of conventional construction."

Lower maintenance and repair cost is but *one* advantage of Aluminum Bodies. All of them are interestingly covered in our book, "Alcoa Aluminum for Truck Bodies." Address, ALUMINUM COMPANY OF AMERICA, 1861 Gulf Building, Pittsburgh, Pa.



NASH-FINCH COMPANY
WHOLESALE DISTRIBUTORS
MINNEAPOLIS MINN

August 13, 1935.

Aluminum Company of America,
1345 Northwestern Bank Building,
Minneapolis, Minnesota.

Attention: Mr. E. T. Hutchinson.

Gentlemen:

In reply to your recent inquiry we are pleased to state that our 22 ft. insulated aluminum semi-trailer body has been repaired by Eckland Bros., Company and is back in service. We lost only two day's time on account of the accident.

Our driver was starting out with a full load, approximately 26,000 pounds when the semi-trailer dropped off from the tractor and slid into a steel post. The impact with the road and the post severely bent the steel semi-trailer frame and this strain, coupled with the sudden shifting of the load, distorted the entire front end of the aluminum body. However, nothing broke except some rivet heads. This is our first severe accident with an aluminum body and we are pleased with the way it stood up.

This body, built by Eckland, has travelled about 60,000 miles during the past year. It is about 1500 lbs., lighter than our conventional equipment of the same size. We also have four smaller trailer bodies built by Schuler Carlson Company using aluminum panels, floor bolsters, and tail gates. Attached is a photograph of one of these wood and aluminum bodies. All of our aluminum equipment has given satisfactory service to date.

Yours truly,
NASH-FINCH COMPANY
Secretary.

LSKing/H

ALCOA · ALUMINUM

PREVENTIVE · PROVES · PRACTICAL · IN ·

An Interview with

J. M. Barkley,

Asst. Supt. of Transportation,
Marshall Field & Company
Chicago, Ill.

NO road failures, not a single accident traceable to mechanical faults and only a minimum of minor repair jobs—that is the mark that has been established by the Marshall Field & Company's fleet of something like 700 trucks and passenger cars, in the past twelve or more months.

But going back into their experiences through other twelve-month periods, the records show up quite differently.

It was a little over a year ago when Marshall Field adopted their present preventive maintenance service system with regular inspections and check-ups. Before then, they had made repairs only when repairs were necessary. And, as J. M. Barkley, assistant to T. B. Johnson, general superintendent of delivery, tells it, their troubles vanished almost immediately when the new system was put into effect.

"The matter of repairs has always been a source of constant concern to us," says Mr. Barkley, "and it is today, just as it will always have to be, for that matter, but it doesn't keep us awake nights worrying about it any more.

"Today our equipment is on the streets, and it is running properly, whereas several units used to be laid up for several days at a time. We have almost forgotten what it is like to have a road failure.

"The pun about 'A Stitch in Time' is, I think, more applicable to fleet maintenance than anything else. Certainly it has been our experience that the best time to make repairs is before they become necessary. In other words, get after the small things before they have a chance to become big ones."

The Marshall Field fleet of about 700 units includes 485 trucks and the balance passenger cars, operated by salesmen and others whose duties require that they use cars in getting around.

Nearly 150 of the trucks are electrics. The gasoline trucks and passenger cars are of just about every known make and model, and they range all the way from small roadsters to the biggest of the heavy-duty tractor-trailers.

Some of their truck equipment has been in service as long as fourteen and fifteen years. Considering this, the mark set in the past year takes on added significance. These older trucks are used only in emergencies and for peak rush periods, however. Marshall Field now has five garages, and to keep the fleet in perfect repair, employs forty mechanics. Under the old system of maintenance they had fifty mechanics.

"When we decided to inaugurate the preventive maintenance service system with periodical inspections and check-ups, we

PREVENTIVE MAINTENANCE SERVICE

TRUCK No. _____ MILEAGE _____ DATE _____

This Report is to be made every 1000 miles or periods not to exceed 30 days.

√ — If OK X — Adjustment Made O — Repairs Needed

Check Here		Check Here	
	ENGINE		**REAR END**
	1. Tighten cylinder head bolts.		25. Inspect rear axle for backlash.
	2. Adjust spark plugs to .025.		26. Tighten axle shaft nuts and inspect for end-play.
	3. Oil fan, examine belt adjustment.		27. Inspect for grease leaks.
	4. Oil generator, starter, distributor.		28. Tighten spring clips and adjust shackles.
	5. Clean and adjust distributor points and check timing.		29. Inspect torque tube, propeller shaft and universal joints.
	6. Tighten intake and exhaust manifold.		**GENERAL**
	7. Adjust valves to proper clearance.		30. Check clutch pedal clearance to toe board.
	8. Inspect ignition wires.		31. Check clutch for dragging and slipping.
	9. Check carburetor and adjust.		32. Test and focus lights, test horn and windshield wiper.
	10. Tighten motor support bolts.		33. Fill battery with distilled water, clean and tighten connections.
	COOLING SYSTEM		34. Test instruments on dash.
	11. Fill radiator before testing system.		**WHEELS AND BRAKES**
	12. Inspect and tighten hose connections.		35. Tighten rim lugs, test for trueness.
	13. Tighten water pump gland nut.		36. Check brake linkage for looseness; oil all connections with penetrating oil, check lining and adjust brakes.
	14. Inspect cooling system for leaks.		**BODY**
	15. Tighten radiator tie rods.		37. Tighten sheet metal parts and body bolts, inspect and tighten body hardware.
	16. Tighten radiator hold down bolts.		**LUBRICATION**
	FRONT END		38. Grease chassis thoroughly.
	17. Test play in knuckle bolts and wheel bearings.		39. Check lubricant in rear axle and transmission and bring to level.
	18. Test front wheels for correct caster, camber, and toe-in.		40. Check engine oil, change or bring to level.
	19. Inspect and tighten steering arms.		
	20. Inspect and adjust tie-rod and drag link.		
	21. Tighten spring clips and adjust shackles.		
	STEERING		
	22. Tighten steering housing to frame.		
	23. Tighten pitman arm.		
	24. Adjust play in steering.		

AFTER ABOVE WORK IS COMPLETED, ROAD TEST TRUCK O. K. _____ SIGNATURE

Time taken for above _____ _____ Mechanic

Note — Items marked O, needing repairs, are to be listed on other side with explanation.

COPYRIGHTED 1931 — GENERAL MOTORS TRUCK CO. SERVICE DIVISION — PONTIAC, MICH.

● MEET MESSRS. BARKLEY AND JOHNSON!

WORK ORDER

Item No.	DESCRIPTION OF WORK TO BE DONE	Time Required	Work Done By
	Total Hours Applied		

Part No.	PARTS USED	Price

Work Completed _____ Date

SIGNED _____ Sup.

Cost Record		
	Total Parts Cost	
	Labor Cost	
	Total Cost	

MAINTENANCE

· MARSHALL · FIELD'S · FLEET ·

"THE pun about 'A Stitch in Time' is probably more applicable to fleet operation than anywhere else," says Mr. Barkley. . . . "Certainly it has been our experience that the best time to make repairs is before they become necessary." This article tells how Marshall Field & Company does it.—H. C. F.

sought to make it as fool-proof as possible," explained Mr. Barkley. "Broadly, I suppose we may be said to have adopted the GMC plan, but we didn't take it up in its entirety. We revised it to suit our own particular needs.

"The way we have it worked out, it amounts to more than a system for periodical inspections; it amounts, virtually, to a 'wrench on every nut' over-hauling every time a car or truck is looked over.

"Our idea is to keep every unit in perfect condition—and emphasis should be placed on the word 'perfect.' I believe that we have worked out one of the most complete systems of inspections and check-ups of any fleet operator in the country."

Marshall Field's trucks and cars are gone over every thirty days or at the end of each 1,000 miles, whichever comes around first. Some of them are gone over as often as three times a month, while a great many, most of them, in fact, are checked on an average of five times every two months.

Inspections are made at night so that the cars and trucks will not have to be called in off their regular runs. When minor repairs and adjustments are necessary, these are made at night. Heavy repairs, however, are held over for the day crews.

As the GMC plan has been revamped to suit Marshall Field's peculiar needs, a 40-item check is made every time a car is pulled in. When they decided on the preventive course of procedure there was no available check-up chart for electric trucks, so they devised a 35-item check plan of their own.

Besides their own check forms, they have manufacturers' chassis charts for every truck and car, and the mechanics also use these in their work.

It is a part of the Marshall Field procedure that whenever a repair has to be made between inspections, these repairs are charged against the mechanic who last went over that car. These between-inspection jobs are shown on the master schedule in red. According to the experience in the past year, these between-inspection repairs consisted largely of necessary brake adjustments.

Tires are checked twice each week for proper inflation pressure. The tubes used on the parcel delivery equipment are puncture-proof. These trucks carry no spares, since a tire seldom, if ever, goes flat on the road.

Oil is checked every time a car is gassed. The oil is changed regularly every 3,000 miles. Grease and other lubrication are checked as a part of the periodical inspection. Marshall Field uses the best grade of solvent-extracted process

(*Please turn to page* 20)

● NEW "DROP-BOTTOM" PANEL DELIVERY

A Million Miles

SOCONY-VACUUM

SOCONY-VACUUM
INCORP

ON SOVAC!

WITHOUT A STUCK RING OR VALVE

THAT'S THE RECORD that's been hung up by a large bus line in New York State.

It's just one example of the Lubrication Profits that the sensational new Sovac Truck Oils are making.

Every day, all over the country . . . the performance of these new oils is proving that they are the most practical heavy-duty oils that have ever been made.

Sold on Savings Basis

Sovac Truck Oils are making history entirely on the basis of reducing costs . . . of giving better lubrication with less oil consumption.

Our files are piled high with attested records of the remarkable economy obtained with these new oils.

One reason Sovac Truck Oils can produce such savings is that they are designed specifically for heavy duty—they are not just ordinary automobile oils which have been adapted to this purpose.

In competition with specified oils . . . in fleets whose management has been satisfied with previous costs—Sovac Truck Oils consistently prove that their controlled use produces Lubrication Profits.

Isn't this just the kind of motor oil that you have been looking for? It will pay you to talk to a Socony-Vacuum engineer today.

Read the Facts that Prove Sovac Truck Oils Can Save You Money

Here are the technical facts:

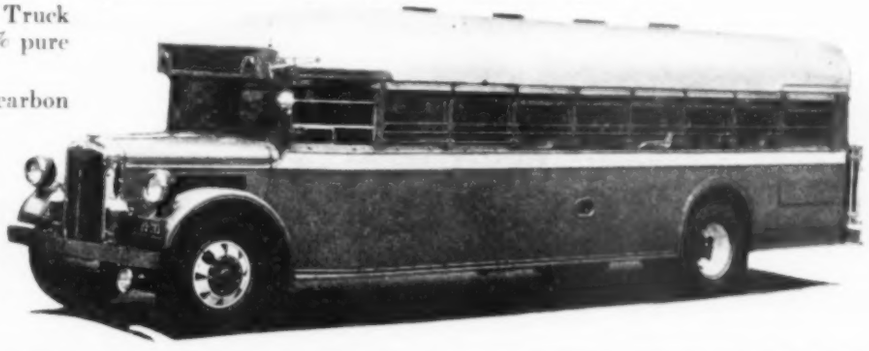
Sovac Truck Oils are made by Socony-Vacuum's Clearosol Process which removes unstable elements that have heretofore defied all ordinary refining methods.

The result is . . . Sovac Truck Oils are practically 100% pure lubricant!

There will be no oil carbon formation, sticky or gummed valves or rings due to this oil!

And, in addition, these new oils have a flatter viscosity curve which means decreased oil friction without sacrificing bearing protection. This quality alone makes Sovac Oils far superior to ordinary oils for truck operation.

A Socony-Vacuum engineer will gladly explain the application of Sovac Truck Oils . . . and help you to earn a Lubrication Profit in your fleet.



STOP AND GO . . . LONG STEADY RUNS—In either case Sovac Truck Oils do a better job. These oils provide better body for greater bearing protection . . . more "oiliness," which is of great importance in reducing wear . . . and, under all conditions, greater stability.

OIL COMPANY
ORATED

STANDARD OIL OF NEW YORK DIVISION
WHITE STAR DIVISION
LUBRITE DIVISION
WHITE EAGLE DIVISION
WADHAMS OIL COMPANY
MAGNOLIA PETROLEUM COMPANY
GENERAL PETROLEUM CORP. OF CALIF.

motor oil exclusively. Since they adopted this oil as standard, there has been a noticeable decline in lubricating faults, according to Mr. Barkley.

Each of the garages maintains a stock-room where a few small parts and supplies are kept. The ready accessibility to factory branches and factory-maintained warehouses eliminates the necessity for carrying a large stock of parts for every make of car and truck.

Each garage also maintains its separate machine shop. The equipment there is such that just about everything except cylinder reboring can be done. Their experience has shown that it is more economical to have this work done on the outside.

By the same token of experience, Marshall Field's also has its vehicle re-paint work done on the outside.

It is to be naturally expected that most of the service troubles should originate with the older units. However, another major source of trouble lies in the salesmen's cars. Those cars which are driven long distances away from Chicago give more trouble than those which can be called in, checked and given the preventive maintenance service.

Under the old system of making repairs only when they were necessary, there were occasional accidents which were traceable to mechanical faults. In the past year, on the other hand, there has not been a single such accident.

As is the experience with practically every large fleet, Marshall Field's trucks and cars are now and then involved in mishaps, but there are several drivers who have gone longer than a year without one.

One month last summer, for instance, after the preventive maintenance system of check-up went into effect, only three accident reports were filed. During rush periods, such as before Christmas when extra help is called in, the number of accidents sometimes rises appreciably.

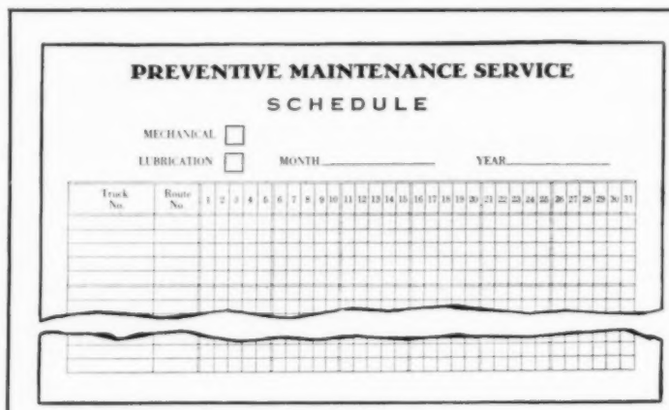
"We believe thoroughly in availing ourselves of the services of the engineering departments of the companies whose trucks and cars we operate and whose accessories we use," says Mr. Barkley. "Their engineering departments have frequently been able to instruct our mechanics in the best methods for making repairs and in the most economical and efficient maintenance methods.

"For instance, one of the leading rubber companies has just recently completed an exhaustive survey of the Marshall Field fleet's entire rubber equipment. Their report makes almost a book-length piece of work, with several photographs, charts, graphs and blue prints being included with the explanatory report. Several truck manufacturers have made similar surveys of our automotive equipment. So have various manufacturers of batteries and other equipment."

The Marshall Field fleet serves three mercantile institutions. These are: Marshall Field & Co., retail, the Davis Store and Marshall Field & Co., wholesale. The average day's run will see 40,000 delivery stops, and there have been times when these have run well over 100,000.

When drivers turn their trucks

(*Please turn to page* 63)



PREVENTIVE MAINTENANCE SERVICE

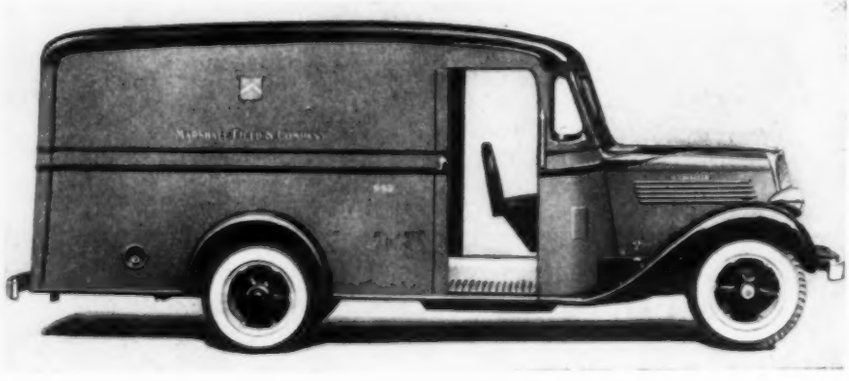
SCHEDULE

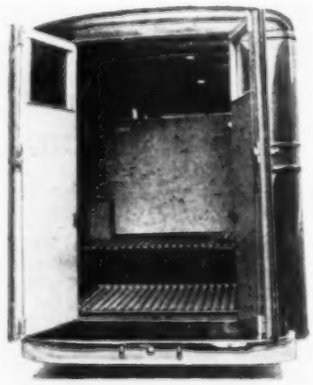
MECHANICAL ☐

LUBRICATION ☐ MONTH _____ YEAR _____

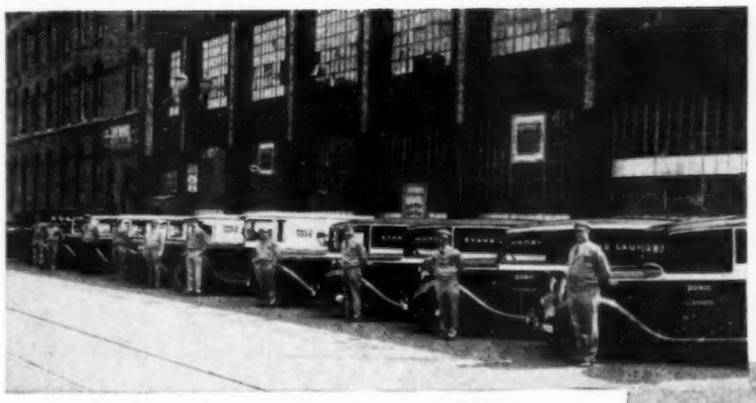
Truck No.	Route No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

This form is used in conjunction with the two shown on the previous pages. It provides a schedule for the current month, to be followed in laying out preventive maintenance work. A special preventive maintenance form is also used for electric trucks.



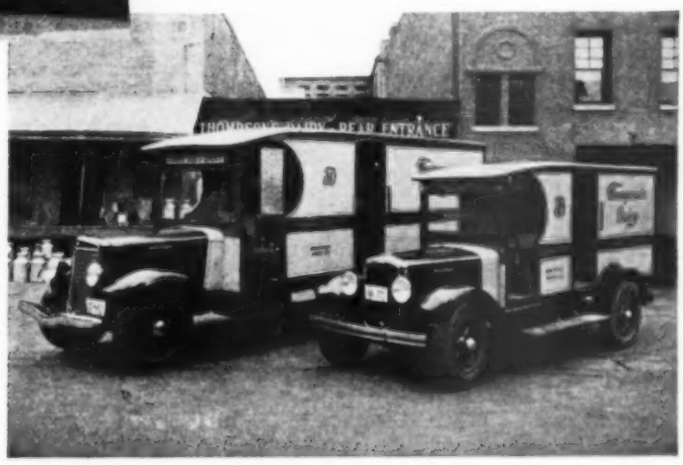


Two views of a new parcel-delivery body recently designed by Mr. Barkley for mounting on a Studebaker Ace chassis. . . . If you are interested in intimate details of this body, you'll find a very complete description of it on page 47 of our October issue.



Evans-Model Laundry of Omaha, Neb., operates 24 trucks, 100% Exide equipped.

The C. H. Musselman Company of Biglerville, Pa., received 228,931 miles of service from an Exide in this truck.



Thompson's Dairy, of Washington, D. C., operates 72 trucks, all Exide equipped.

Operators everywhere have learned that Exide Batteries cut costs

Here are three instances, representing different types of trucks, widely differing requirements, and different sections of the country . . . but with battery experiences strikingly similar.

A laundry, using light delivery units equipped with Exides exclusively, reports that Exides cut battery maintenance costs, improve service and reduce delays.

A dairy, operating both large and small trucks, standardized on Exide for replacement after proving that these batteries lowered delivery costs by minimizing battery maintenance and delays.

An operator, carrying apple products over long hauls, replaced an Exide after 3½ years and 228,931 miles of service.

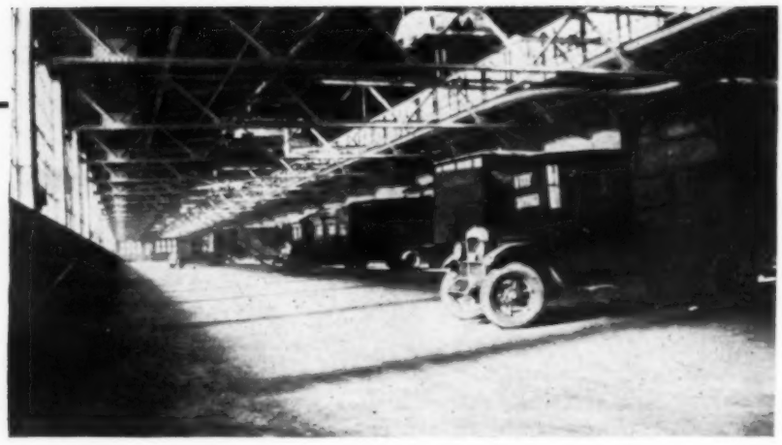
These experiences, plus those of hundreds of other operators, are proof that Exide Batteries can save money for you.

Exide Engineering Service, conducted by trained and experienced battery engineers, is available to fleet operators, free. Why not let Exide Batteries, plus this service, cut your battery maintenance costs?

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

EXIDE HYCAP—a new line of *extra high capacity* Exide Batteries featuring MIPOR—the exclusive new Exide permanent, latex-base separator. They meet the most rigid winter starting requirements with power to spare.

Exide
BATTERIES
FOR EVERY TYPE TRUCK



• THE "CONCOURSE," FOR LOADING AND STORING

FORTY · FRIENDLY · DRIVERS FURNITURE FLEET

FOR some good reason, the author of this article prefers to remain anonymous. . . . Feeling that he owes us a debt of gratitude, he passes on HIS reactions on fleet maintenance. . . . "But don't tell them it's me!" he admonishes us; so we'll forever keep our peace.—H. C. F.

THE task of keeping a fleet of furniture trucks, tractors and semi-trailers in condition so that they are constantly at the disposal of the shipping department, when and where needed, is similar to that faced by many readers of this publication. It is an interesting problem, any way you look at it, and those who like to see everything go along in high gear will probably find something of value in the writer's own experiences and observations along these lines.

The first essential of successful fleet maintenance is to have the hearty cooperation of the entire organization, especially those with whom you have contact in the routine of your duties, and above all, the drivers of the vehicles. These are the boys who can cause you plenty of "grief" if they are not interested in their work, or in the truck which is in their charge.

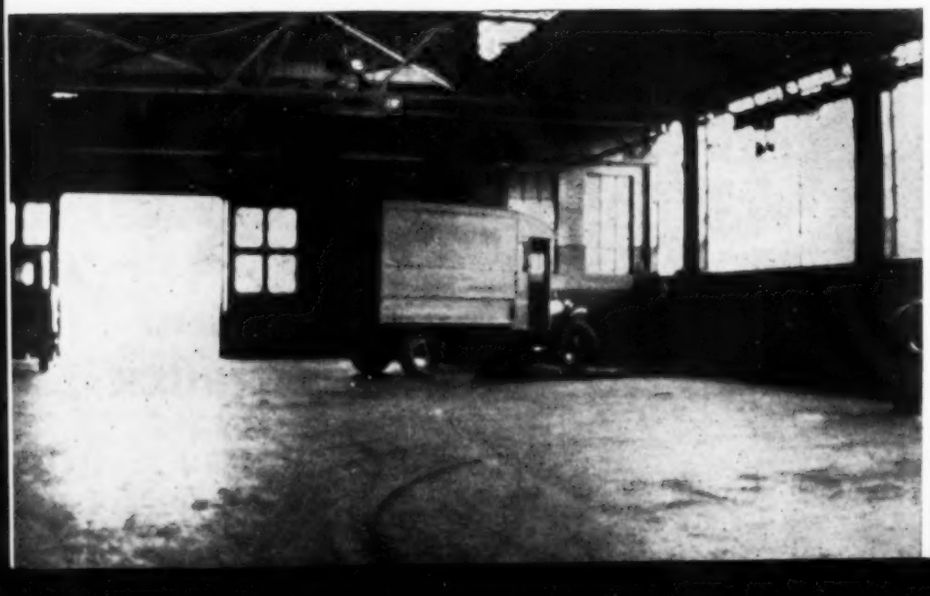
We believe that it pays to make every driver feel that he is "somebody" in the organization; make them feel that the trucks which they are handling are their very own; then they will take pride in them, as to appearance and performance, and the result will be a more efficient driver personnel and a more satisfactory operating and maintenance record.

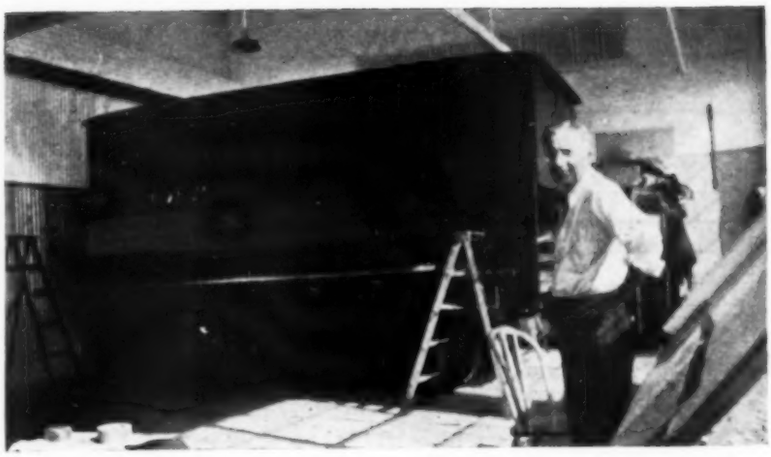
Of course, the writer has had a few differences with his drivers—and who hasn't?—but in the aggregate, we feel that they measure up to any other like number of men, insofar as courtesy, satisfactory deliveries and care of equipment are concerned. As a matter of fact, accidents in our operation are comparatively rare, and even then, only of minor character. In the few cases where damages to other vehicles or property were made, the claims were adequately taken care of by insurance and there was no need of arguments with our drivers.

For best results in performance, with a minimum of service work and the maximum in vehicle longevity, we believe that it pays to delegate the same driver to the same truck at all times.

We are strongly opposed to the idea of changing drivers around among the different trucks, and in our fleet this is done only when absolutely necessary. Our theory (and it works in actual practice) is that if the same driver has "his own" truck regularly, he can then

• WHOSE GARAGE IS THIS, MISTER SHERLOCK?





• "SMILING CHARLIE," SYNTHETIC SLICKER-UPPER

A · FAR-REACHING · FACTOR · IN MAINTENANCE

By A. Maintenance Mann,

(Who Operates a 40-Vehicle Fleet in Michigan)

be held responsible for its condition, and naturally, he will take more personal interest in it.

In our particular operation, the trucks are used for delivering furniture from our store. For loading, all trucks are parked on a "concourse" as shown in one of the illustrations, each one having its own place at a numbered loading bin. These bins are directly connected with the shipping floor from where the bins are loaded, according to the route to which the particular truck is assigned.

Each driver loads his own truck and checks the bills, routing them so as to facilitate deliveries according to his knowledge of the route. Exception to this general practice is made during peak periods, when a night crew does the loading.

The aforementioned "concourse" also serves as the regular parking station for the trucks. Minor adjustments and tuning-up are done on the trucks at these very same stations by our night mechanic, while those of a more extensive nature are sent to the repair shop.

Major repairs are done mostly by our day mechanic. In addition to minor repair work, our night mechanic also answers service calls during peak periods when our trucks are being operated late into the night. In addition to these two mechanics, our maintenance personnel consists of one painter (sometimes two), two porters, and the writer, who is the garage superintendent.

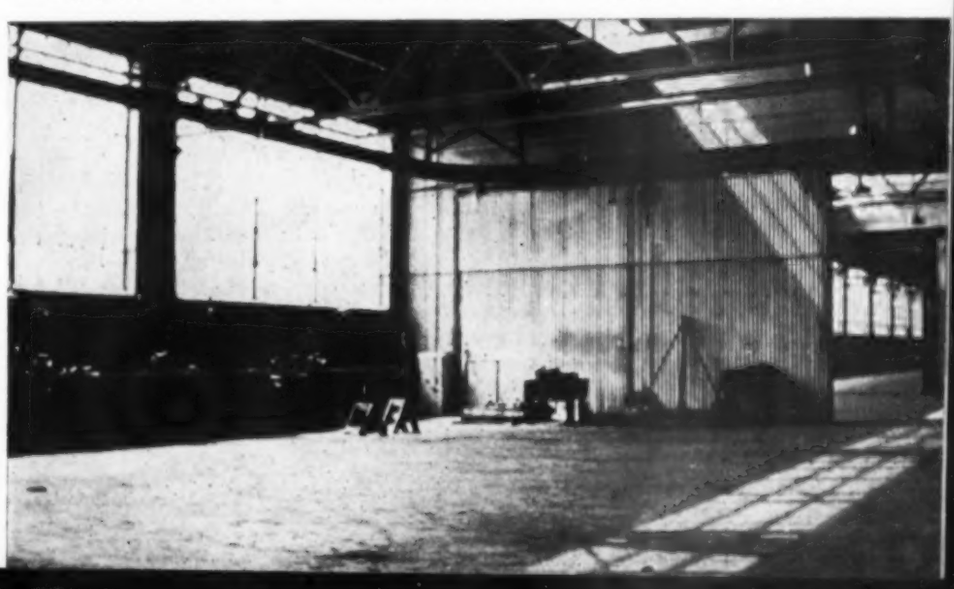
We do not make periodic overhauls now, as had been our practice previously. Outside of valve-and-carbon work and tune-ups, the motors are not overhauled until they show signs of high oil consumption, loss of power or indications of bad bearings, when they are torn down and given a thorough rebuilding.

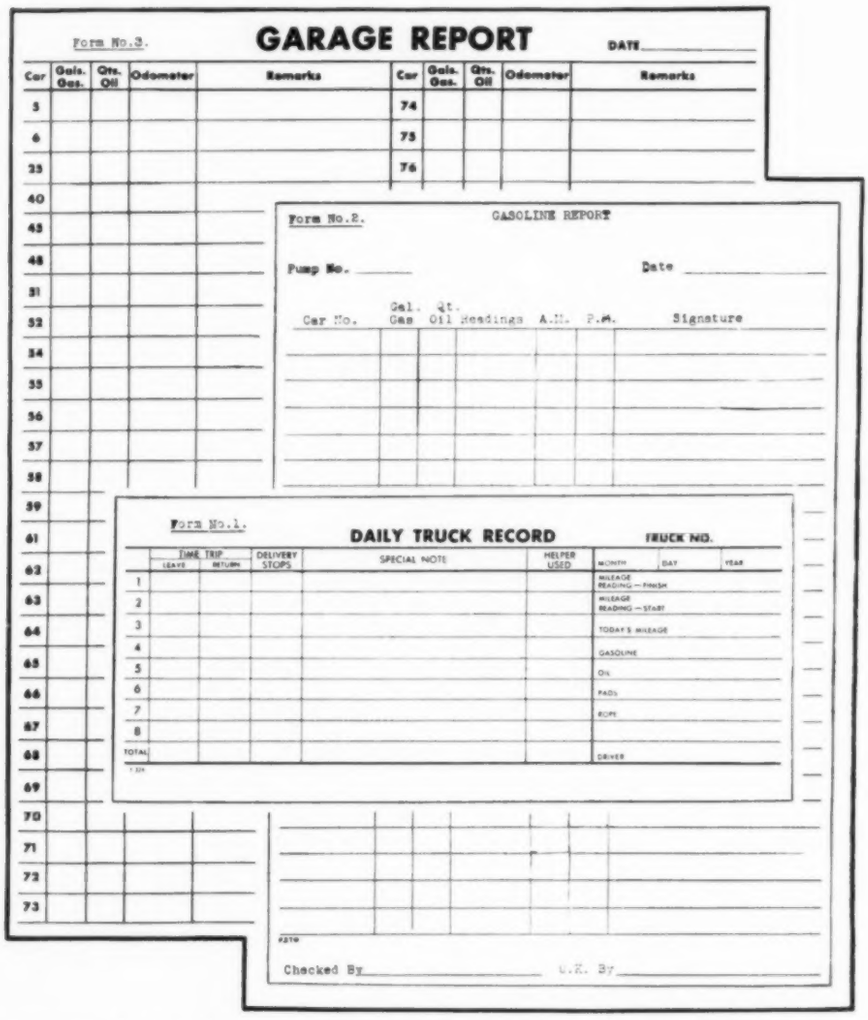
During our former practice of overhauling at certain specified periods, parts were often replaced when they still had plenty of "service miles" remaining, which, of course is an uneconomical procedure to follow.

Failure of a truck to properly perform in any way is immediately reported by the drivers in a book provided in the shop for that purpose. The complaint is checked by our night mechanic, who corrects the trouble if of a minor character

(Please turn to next page)

• TRUCKS OUT OF THE SHOP IS "GOOD BUSINESS"





Form No.3. **GARAGE REPORT** DATE

Car	Gals. Gas.	Qts. Oil	Odometer	Remarks	Car	Gals. Gas.	Qts. Oil	Odometer	Remarks
5					74				
6					75				
35					76				
40									
45									
48									
31									
32									
34									
55									
56									
57									
58									
59									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									

Form No.2. GASOLINE REPORT

Pump No. _____ Date _____

Car No.	Gal. Gas	Qt. Oil	Readings	A.M.	P.M.	Signature

Form No.1. **DAILY TRUCK RECORD** TRUCK NO.

	TIME TRIP LEAVE	TIME TRIP RETURN	DELIVERY STOPS	SPECIAL NOTE	HELPER USED
1					
2					
3					
4					
5					
6					
7					
8					
TOTAL					

MONTH | DAY | YEAR

MILEAGE READING—FINISH

MILEAGE READING—START

TODAY'S MILEAGE

GASOLINE

OIL

PADS

ROPE

DRIVER

Checked By _____ O.K. By _____

HERE are the three forms used in this fleet, and to which the maintenance man refers in this article. . . . They really tie-in with each other, the large one (No. 3) being the "recap" sheet. . . . No. 1 serves as a drivers' trouble and work report, while Number 2 is both a record and a receipt for gasoline dispensed. . . . At the end of this article (directly opposite) the use of all of these forms is explained in more detail.

—if major, the truck is held over in the shop for a thorough going over by the day mechanic, under the writer's supervision.

Our trucks are washed daily (nightly) when the weather is bad, and periodically, (after washing) the springs are lubricated, using discarded crankcase drainings for this purpose. Each night as the trucks come in, they are checked by the night porter for oil, water in radiators, speedometer readings and condition of tires. Any tires which are not fit for the road, are, of course, changed immediately.

Oil change is done at a predetermined schedule which averages about 1,500 miles. Chassis and gear boxes are greased and filled monthly; oftener if needed. Batteries are checked and filled every two weeks.

Gasoline is received on our railroad siding, in tank cars, and is dumped into a storage tank of 18,000-gallon capacity. We use the hydraulic system, which is very satisfactory. By this method, when the gasoline is run into the tank, the water therein is run out, carrying with it any sediment which might be in the bottom, thus keeping the tank practically clean at all times.

The gasoline pumps are located just inside the entrance to the concourse, and as the trucks come in from their day's run, they are gassed up so that there will be no delay on the morning start.

Most of our trucks make two runs daily. Several times a week a truck is given a full day's run in several directions, making suburban deliveries, averaging from 50 to 150 miles out of the city. Although all routes are completely covered by specific trucks, there are often special trips required, which are cared for by extra trucks which are always available, since the latter are not used on our regular routes.

Spare tires are only carried on the trucks which make the longer suburban runs. Since most of our trucks have dual rear tires, there are always two reserve tires to "get by" with, in case of an emergency, when the tires could be changed about. The percentage of trouble under this arrangement is surprisingly low. In fact, our average tire mileage is very satisfactory to us.

Our bodies are built, repaired and painted in our own shop. These bodies are of the van type, constructed on a steel foundation. Sills are of structural steel channel, bolted to the frame and then bolted together. The cross-sills take a hard-wood filler to which the floor is fastened. Floors are of oak, closely fitted, with edges rabbeted to bring even the metal strips covering the joints, thus giving a perfectly level floor surface.

Wheel-housings do not enter into the body construction, allowing the more convenient placing of merchandise and preventing breakage, due to uneven packing. Sides are sheeted with white ash and then covered with 20-gauge sheet autobody steel. Side-panels and cab are similarly constructed.

Painting is done about every two years—that is, a complete job. In between these periods the necessary touch-up work and revarnishing with "clear" is done as needed.

Three printed forms are used in the operation and maintenance of our fleet.

Form Number 1 is made out daily by drivers, checked against Form Number 2 and then the figures are transferred over to Form Number 3.

Form Number 2 is used at the gas pumps. The column "Readings" refers to the pump readings and shows the gasoline dispensed to each car. This form is checked by the superintendent and then transferred over to the Garage Report, Form Number 3.

Form Number 3 is the summary of gas, oil and mileage of all trucks. The Remarks column is for special notes regarding repairs.

OUR EXPERIENCE WITH SELF-INSURANCE

By S. D. McMurray,
Assistant General Manager,
White Star Bus Line, Inc., Hato-Rey, Porto Rico

HERE is one of the "off-shoots" of our recent survey on Motor Vehicle Insurance . . . . Traffic conditions are probably much different in Porto Rico (we've never been there) and there are probably considerably less "ambulance-chasing" lawyers than here in our own neck-of-the-woods. . . . So when reading and digesting this operator's experience with Self-Insurance, you'll remember that it's in a different country, where the people are different, driving conditions are different, customs are different, and most everything else is different, excepting perhaps the language, the currency and their favorite publication.—Editor.

ABOUT five years ago our company became convinced, after a careful study, that we could be "self-insurers" at a considerably lower cost per year than we were then paying in insurance premiums, to give us the necessary protection covering a bus operation of our size and scope. (We operate a fleet of around 170 buses, 5 trucks and 6 service cars. Approximately 130 of the buses are in daily city operation, running somewhere around 6,000,000 miles per year, and transporting about 21,000,000 passengers annually.)

When inaugurating this plan of self-insurance, we first set aside a sum of money as a reserve fund, then we arranged that the amount we were formerly paying in insurance premiums be paid daily into this new fund. After a few years of operation, most of the original reserve fund had been paid back; then later, the daily amount set aside for the insurance fund was reduced, leaving, however, always on hand a fund large enough to handle all normal accidents and claims.

Under this plan, we are "self-insured" as to the risks of Collision, Public Liability, Property Damage and Workmen's Compensation. Fire insurance, however, is carried in a stock company. Theft insurance, obviously, is not carried, as it is quite unnecessary in this country.

It is only logical to ask, "How satisfactory is this type of insurance, and how does it compare with insurance plans offered by stock or mutual companies?" . . . The answer is this. Our experience in 1934 reveals that our *total cost* of insurance, including Fire, Collision, Public Liability, Property Damage and Workmen's Compensation, amounted only to but one-half cent per mile—0.535 cents, to be exact.

Under our former plan of only insuring against collision, public liability and property damage, the premiums paid to the stock company amounted to 75 per cent *more* than we are now paying for *all* of our insurance costs. In addition, we have changed our claim department into a "good-will builder" as you will read, later on in this article.

Our Claims Department is made up of three people—a manager who investigates and adjusts claims; a legal adviser; and a stenographer-filing clerk. The assistance of our Traffic Inspectors is utilized by the manager of the Claims Department, when he needs additional help on certain cases.

Responsibility for immediately reporting each accident rests with the driver of the vehicle involved. If the accident is a serious one, the driver stays right at the place of the accident until the Claims Manager arrives. When he does, he takes the names of all passengers and eye-witnesses of the accident, previously recorded by the driver. He also takes photographs of the accident when possible, picturing the condition or position of the vehicle and the other vehicles or persons involved.

In cases of minor accidents where the Claims Manager is not called to the scene, the driver makes his report of the accident at the end of his shift. In all cases, the driver is automatically suspended from duty until his guilt or innocence is determined by the Claims Department. Failure on his part, to get the names and addresses of all passengers in the bus at the time of the accident, results in severe punishment. Failure on the part of the driver to report even a small accident, results in his dismissal, or in suspension, followed by proba-

(*Please turn to page* 63)

Free ad. for someone? . . . . No, the destination sign on this bus, which is typical of the vehicles in the fleet, is the name of a thickly populated suburb of San Juan. . . . The bodies are all-aluminum jobs, proving that they are progressive down in Porto Rico, and realize the advantages of cutting down dead weight.

• NEWS of the TRUCK INDUSTRY •

Two Shows of Importance

AS this issue goes to press, we are on the eve of two important major automotive shows. . . . First the Motor Truck Show, held at Newark, N. J., October 29th to November 2nd. . . . Then, the National Automobile Show to be held in New York City, November 2nd to 9th. . . . Many new models of passenger cars have been announced by this time; also several new truck models which are illustrated and described in this issue. . . . A full report of the Motor Truck Show will appear in our December issue.

•

Bauman Promoted at White

AT a meeting of the Board of Directors of the White Motor Company held last month, J. N. Bauman, general sales manager, was elected vice-president in charge of sales. . . . Mr. Bauman's election follows his appointment as general sales manager in only three months, and comes as a recognition of his success in directing the sales activities of the company. . . . Frank M. Bender was elected vice-president in charge of operations. . . . It was also announced that T. R. Dahl, executive vice-president and secretary of White, has resigned.

•

Cyrus H. McCormick Resigns

AFTER fifty-six years of continuous active service in the farm implement industry, Cyrus H. McCormick has resigned as chairman of the board of directors of the International Harvester Company. . . . His brother, Harold F. McCormick will succeed him in that office. Cyrus McCormick, however, will remain as a member of the board of directors.

•

Autocar Gets Atlantic Order

CONFIRMATION of the Atlantic Refining Company's order for 45 heavy-duty tank jobs was obtained from Autocar factory officials last month. . . . This order is said to be the largest single purchase of heavy-duty equipment in the petroleum industry in 1935. . . . It specifies 45 of the Model UD Autocar trucks, and each unit will be equipped with a 1,200-gallon gasoline tank.

Moreland Receivership Lifted

THE Moreland Motor Truck Company of Burbank, Calif., announced last month, through its president, Watt L. Moreland, that the friendly receivership entered into by the Company in 1933 was lifted on October 14th. . . . Through a loan provided by the RFC, the company is now said to be in an exceptionally strong financial position. . . . Moreland has been building trucks for 25 years, largely to order, for West Coast hauling requirements. A completely redesigned line of trucks for 1936 is now in production, including several Diesel-powered jobs.

•

Kingston Completes New Factory

THE completion of a new factory building which adds 35,000 sq. ft. to its manufacturing facilities is announced by Kingston Products Corporation, Kokomo, Ind. The new unit is located immediately north of the main Kingston plant. . . . The new building is of brick-over-steel construction, 270 feet long by 130 feet

wide, with modern "daylight" windows. It will be devoted entirely to manufacturing, its construction having been made necessary by the company's rapidly growing business, throughout its various lines.

•

Studebaker Adopts U. S. Royals

THE adoption of U. S. Royal truck tires by the Studebaker Corporation of America, as standard equipment on the entire line of Studebaker trucks is announced by the U. S. Rubber Company. . . . The Studebaker line ranges in size from 1½ to 4-ton models, with tire equipment ranging from 6.00-20 and 32x6, eight-ply, to 36x8, twelve-ply, and 9.00.20.

White Figures Show Progress

FIGURES submitted to the Board of Directors, by Robert F. Black, president of White Motor Company, indicate the success which their models are meeting with. . . . In the first three-quarters of 1935, the dollar volume of White buses exceeded $4,000,000—more than all of 1934. . . . Export shipments of White trucks during September and October were more than double those of the corresponding months of 1934. . . . White's production schedule for 1936 calls for 25,000 units, which is double the volume of the company's best previous year. . . . The new streamlined Whites are now being produced at the rate of 40 per day, to meet actual orders, Mr. Black said.

•

Mack Gets Order for 20 Pumpers

CHARACTERIZED as the largest order for high-pressure fire pumping engines ever placed by the municipality, award has recently been made by the Commissioner of Purchases, City of New York, to the Mack-International Motor Truck Corporation of New York, for twenty 1,000-gallon double combination fire pumpers. . . . Deliveries are to start soon and these pumpers will bring the total number of Mack fire apparatus purchased by the New York Fire Department to a total of 187 vehicles, since 1912.

•

Business Better with G. E.

ORDERS received by the General Electric Company for the third quarter of 1935 amounted to $54,400,819, compared with $40,458,901 for the third quarter of 1934, an increase of 34 per cent, President Gerard Swope announced last month. . . . Orders received for the nine months amounted to $158,943,765, compared with $132,613,543 for the nine months last year, an increase of 20 per cent.

•

McKinstry New IHC Chairman

THE directors of the International Harvester Company at their meeting last month appointed A. E. McKinstry chairman of the board's executive committee, which has heretofore been known as the finance committee. . . . This office was left vacant by the recent election of Harold F. McCormick to succeed his brother, Cyrus H. McCormick as chairman of the board of directors. . . . When Mr. McKinstry retired as president of the company on May 1st, 1935, he retained his membership in the board of directors and in the important committee of which he is now chairman.

•

Aluminum Industries Chicago Office

THE opening of a new office in Chicago, at 616 S. Michigan Ave., is announced by Aluminum Industries, Inc., Cincinnati, Ohio, makers of Permite products. . . . The office will be the headquarters for sales representatives and sales engineers serving the central states.

AUTOMOTIVE DIESEL ENGINES

FOREWORD:

IN compiling this presentation of Automotive Diesel Engines, we have attempted to include only such engines as have been expressly designed for the propulsion of automotive vehicles, such as trucks, buses, etc.

We have purposely omitted those makes that are designed for other applications, such as stationary, marine, rail-car, farm-tractor or airplane uses.

Four American manufacturers (to our knowledge) have made definite efforts to provide the automotive industry with Diesel engines, and are now offering them either as replacement units, or as optional equipment in vehicles of various manufacture.

These manufacturers (again, to our knowledge) are Buda, Cummins, Hercules and Waukesha. If there are others, we have not been informed of their activities, and therefore, the following presentation will be confined to the automotive offerings of the four manufacturers mentioned. Brief general specifications appear directly below, and more intimate descriptions appear on subsequent pages of this issue.—H. C. F.

SPECIFICATIONS:

Engine Make	Model	No. Cylinders Bore & Stroke	Cu. In. Piston Displacement	Max. H.P. at R.P.M.	Max. Torque at R.P.M.	Comp. Ratio	Injection System Make	Weight Lbs. Complete
Buda	4D-186	4—3⅝ x 4½	186	42 @ 2000	110 @ 1500	14.	Ex-Cell-O	885
Buda	6D-415	6—4 x 5½	415	91 @ 2000	260 @ 1450	14.	Bosch	1439
Buda	6D-468	6—4¼ x 5½	468	107 @ 2000	304 @ 1500	14.	Bosch	1460
Buda-Lanova	6LD-909	6—5¼ x 7	909.2	178 @ 1500	700 @ 800	12.5	Bosch	3550
Cummins	AA-6	6—3¾ x 5	331.4	85 @ 2200	232 @ 800	17.	Cummins	1200
Cummins	HA-4	4—4⅞ x 6	448	83 @ 1800	283 @ 800	17.	Cummins	1550
Cummins	HA-6	6—4⅞ x 6	672	125 @ 1800	425 @ 800	17.	Cummins	1950
Hercules	DJXB	6—3½ x 4½	260	77 @ 2600	186 @ 1300	14.5	Bosch	825
Hercules	DJXC	6—3 11-16 x 4½	288	81 @ 2600	198 @ 1300	14.5	Bosch	825
Hercules	DRXB	6—4⅜ x 5¼	474	120 @ 2000	350 @ 1300	14.5	Bosch	1435
Hercules	DHXB	6—5 x 6	707	176 @ 1800	530 @ 1400	14.5	Bosch	2300
Waukesha	6D-80-278	6—3⅝ x 4½	278	.....	.....	17.	Bosch	750
Waukesha	6D-100-462	6—4⅜ x 5⅛	462	100 @ 2200	275 @ 1000	17.	Bosch	1675
Waukesha	6D-125-585	6—4¾ x 5½	585	125 @ 2200	360 @ 1000	17.	Bosch	2150
Waukesha	6D-140-648	6—5 x 5½	648	140 @ 2200	410 @ 1000	17.	Bosch	2165

For further information, literature, catalogs and other data covering any of these Diesel Engines, address The Editor, FLEET OWNER, 90 West St., New York, N. Y.

• TYPICAL DIESEL-POWERED TRUCK FLEET OPER

DIESEL

• FOR • AUTOMOTIVE

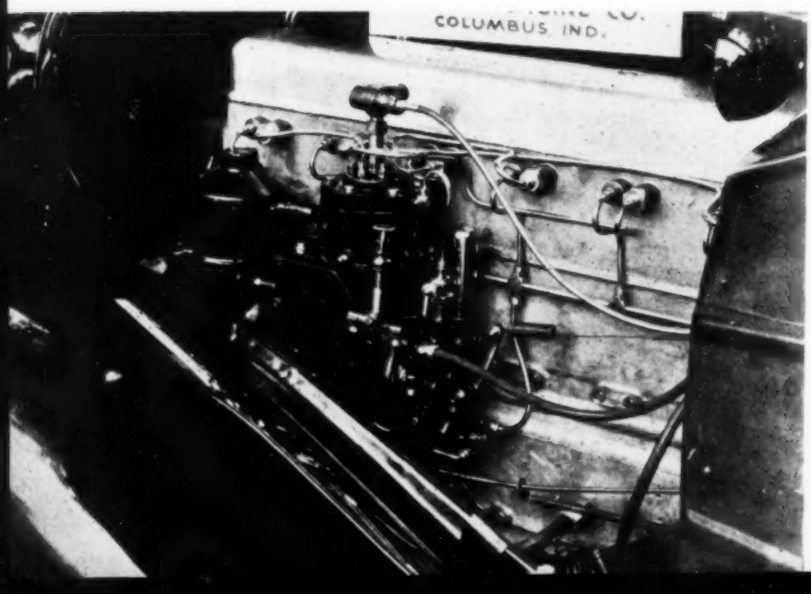
• CUMMINS •

CUMMINS Diesel automotive engines are built in two distinct types, with several models designed for different requirements.

The engine shown on this page is the newest addition to the Cummins line, being similar to the one used by C. L. Cummins in the Auburn car which made the transcontinental trip from New York City to the West Coast on a fuel cost of $7.63. It is designated as Model "A" and is a 6-cylinder job with a bore and stroke of 3¾ x 5 inches. This engine develops its maximum of 85 h.p. at 2,200 r.p.m., the makers state. Other specifications may be found on the preceding page.

The engine shown on the opposite page is the 6-cylinder version of the Cummins "HA" series, having a bore and stroke of 4⅞ x 6 inches. This series is available in four and six cylinders, with separate models for truck and bus work. The "HA" series develop their maximum h.p. at 1,800 r.p.m., the four delivering 85 h.p., and the six, 125 h.p. Other specifications may be found in the table on the preceding page.

• CUMMINS' MODEL A, LIGHT DIESEL SIX



Like all Diesel engines, the Cummins Diesel is a compression-ignition engine, in which air, (taken in on the intake stroke) is compressed to 500 lbs. and develops a temperature of about 1000° Fahrenheit. Into this heated air the fuel is mechanically injected, and ignition takes place automatically, without the use of mechanical or electrical sparking devices.

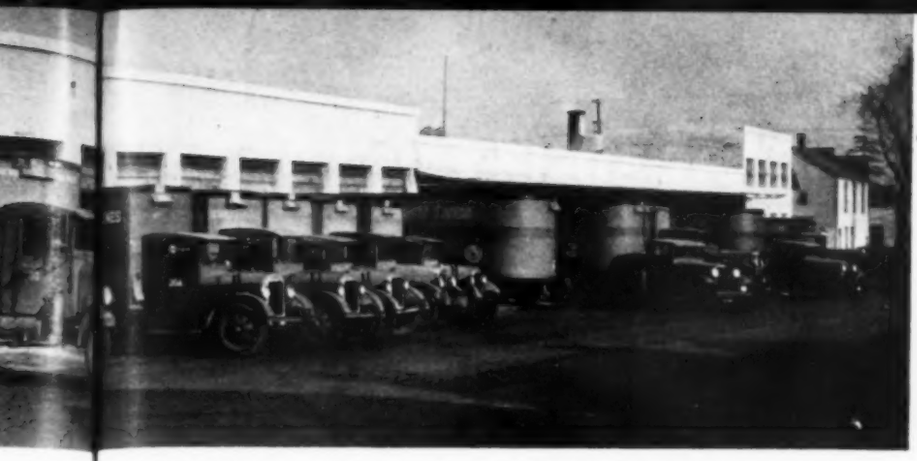
The following is the manufacturer's description of the Cummins Diesel principles: "By means of the Cummins fuel injector, the fuel oil is first gasified, and then, by means of an overhead rocker-arm-operated plunger, it is forced into the heated air in the cylinder at the beginning of the power stroke. A fuel distributor and the injectors take the place of the carburetor and ignition system in the conventional gasoline engine.

"The functioning of the various parts are as follows: The fuel oil is first taken from the fuel tank and delivered by means of a pump, at 110 lbs. pressure, to a metering plunger, located in the unit which forms the primary injection system.

"From there, the fuel oil goes through a distributor disc, located in the same unit, which may be likened to the distributor of an electrical system, except that the oil flows through openings, while the spark passes through wires. From this distributor, the oil is delivered through fuel lines to the proper injectors, one of which is incorporated into each cylinder head.

"The fuel oil is pre-heated and gasified in each injector body, and the action of the rocker-arm-operated injection plunger causes it to enter the cylinder, where ignition takes place. There are no high-pressure fuel lines on the outside of the engine, since all of the 'forcing' is done inside of the injector body, by mechanical means.

"The distributor unit and metering plunger are all mounted in one unit, together with a governor, on the left-hand side of the engine. There is but one metering plunger, which serves as a 'master' plunger, the distributor.



FLEET OPERATED IN THE PACIFIC NORTHWEST

ENGINES

TRANSPORTATION •

by means of indexed discs, taking care of the distribution of fuel oil to each injector body, as before mentioned. The metering plunger is so arranged that its stroke can be varied in accordance with the load or engine speed, and it can be operated by linkage connected to accelerator or hand throttle.

"The injectors, one of which is located in each cylinder head, consist of a forged steel body, held in place by two bolts. The injector plunger is closely fitted and is operated not unlike an overhead valve, by means of cam shaft and rocker-arms.

"On the intake stroke, fuel oil is admitted into a small space under this plunger. As the piston goes up on the compression stroke, the oil is gasified. Slightly ahead of top center, the cam operating the push rod and rocker-arm, causes the plunger to push the gas charge into the cylinder through six small holes located in the bottom of the injector body. The plunger remains seated through the compression and exhaust stroke, after which the aforesaid cycle is repeated.

"To facilitate high turbulence during the combustion stroke, there is a small bottle or cavity in the top of each piston. On the upstroke this fills with air, which is blown out against the injector tip and throughout the cylinder cavity on the down stroke.

"No combustion takes place on the inside of this bottle due to the small diameter of the hole in the top.

"There are no adjustments to be made by the operator. The pumps are tested at the factory and remain in adjustment for an indefinite period.

"Cummins engines are started electrically and are provided with heavy-duty generators and heavy-duty starting motors. Two 12-volt batteries, or one 24-volt battery is needed.

"It will be observed from the illustrations that the general appearance of these engines is not greatly different from that of a gasoline engine. In fact, they have been so designed that they can readily be used as replacement for gasoline units.

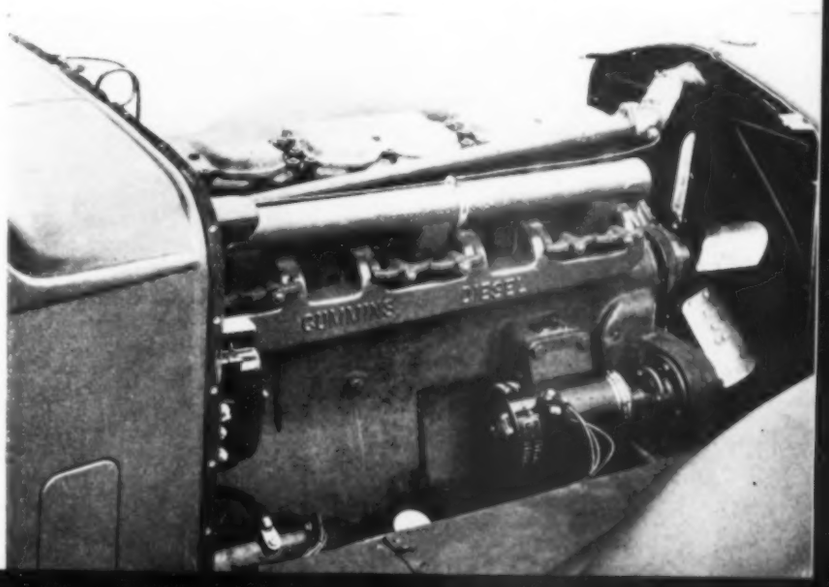
"Cummins engines have been installed in various standard makes of trucks and will appear at the New York Automobile Show for the first time, in a 9-passenger Auburn chassis.

"The sensation of driving a truck with a Cummins engine is not greatly different than driving a truck equipped with a gasoline engine, except that a higher rate of acceleration will be noted; and due to the high torque characteristics, hills can be negotiated in somewhat higher gear."

The picture at the top of these pages represents a portion of the fleet operated by Consolidated Freight Lines, Seattle, Wash., and Portland, Ore. This fleet, at our last interview, operated 54 Cummins Diesel engines in highway units; they have been using them since 1933, the manufacturer reports. There are many other fleet operators who are successfully using these Diesels; in fact, the Cummins factory reports more than 1100 Cummins Diesel engines in use on the highways.

Complete description of these engines, together with all dimensions, operating characteristics, etc. can be secured by writing to the Editor of this publication. There's no obligation, of course.

• CUMMINS' MODEL HA-6 TRUCK DIESEL



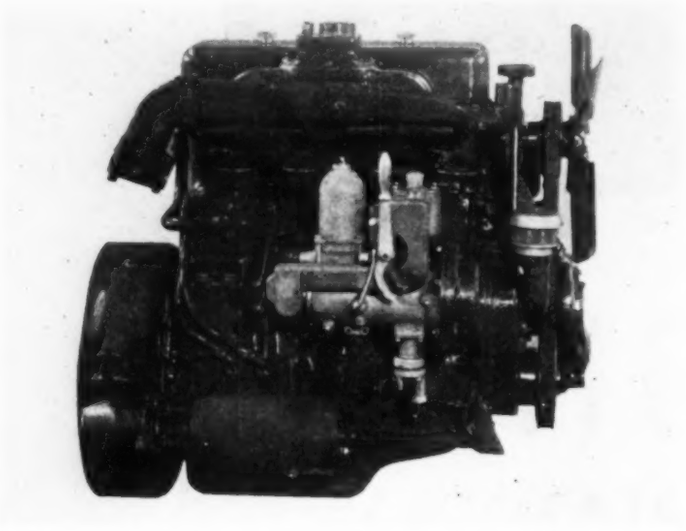
•BUDA•

THE Buda Company offers four Diesel engines for automotive use. Major specifications of these Diesels appear in the specification table on page 27. The two pictures on this page are representative of the two smaller models. Here is a quotation from the manufacturer's literature:

"The Buda Diesel is a compressorless, airless-injection engine of the four-stroke-cycle type, possessing all of the operating features of heavy-duty internal-combustion engines, requiring practically the same space and having the added advantages of simplicity of operation, exceptionally low fuel consumption, lower price per gallon of fuel, and electric starting.

"Compared with gasoline engines, Buda Diesels use the cheaper hydro-carbon fuels and enjoy a lower consumption per horsepower, especially under variable load conditions. These Diesels eliminate accessories and drives such as are required for magnetos and distributors. They are classed as Diesels of the light-weight, high-speed type."

As the specification table on the preceding page shows, Buda is offering for automotive work four models—one a four-cylinder job, and the other three in six-cylinder types. The illustration at the bottom of this page is representative of the six-cylinder jobs having bores of 4 and 4¼ inches. At the top of the page, the four-cylinder job is shown. Another type of Buda Diesel, not illustrated, is the "Buda-Lanova" Diesel engine, which is built in a larger size, with bore and stroke of 5¼ x 7 inches and weighs, complete, 3,550 pounds.



Fuel-pump and injector side view of Buda's Model 4-D-186 automotive Diesel engine. This is a 4-cylinder job with bore and stroke of 3⅝ x 4½ inches. It weighs 885 pounds, complete.

According to manufacturer's literature, the small 4-cylinder Buda Diesel uses the "Ex-Cell-O" fuel injection system, while the others all use the Bosch fuel-pump. With these systems, fuel injection is accomplished by means of a positive mechanical (solid) injection pump, with fixed length of stroke. The amount of fuel injected into each cylinder is automatically controlled by a governor.

The nozzles are of the "pintle" type, self-cleaning, with spring loaded stems. The fuel is sprayed horizontally into the combustion chamber, parallel with the piston head, and does not strike the pistons or cylinder walls. Nozzles can be easily removed for inspection and service work, the makers state. Governor is of the variable speed type, driven by spiral gear from the fuel-pump drive shaft. Ignition, of course, is by compression, for both starting and running.

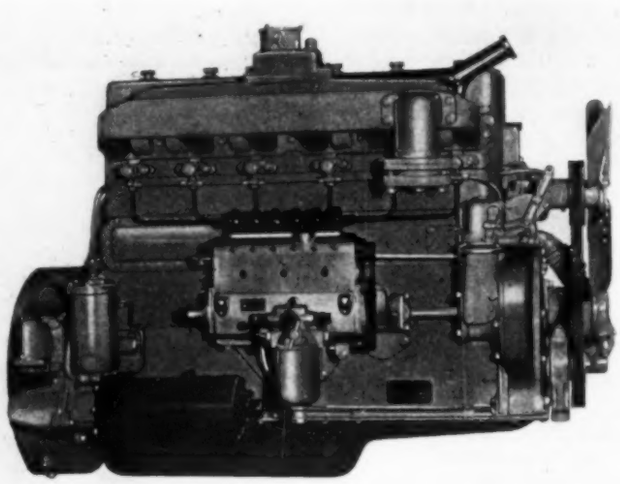
The Buda-Lanova Diesel operates under a lower compression-ratio—12.5 to 1. The special design of this type of engine warrants the following detailed description of its combustion system:

"In the Buda-Lanova system, the fuel leaves the nozzle and passes along the common center of two lobes formed in the cylinder head, under the intake and exhaust valves, and directly over the cylinder proper. It then passes through the hot compressed air, which is generated in the compression stroke, into minor and major air chambers, or energy chambers.

"This fuel-air mixture, which is fuel in conjunction with the air picked up in the passage of the fuel as above described, traveling together and passing through an orifice of venturi form, causes a very violent combustion upon its entry into the energy chambers.

"The combustion set up in these energy chambers violently discharges back into the main combustion chamber, thus impinging on such residual spray as is still leaving the nozzle and is in suspension. This counter-flow or back-fire of the energy chamber sets up a violent tur-

(Turn to page 64)



Fuel-pump and injector side view of Buda's Model 6-D-415 and 6-D-468 engines. These Diesels have bores of 4 and 4¼ inches and a stroke of 5 inches. The Bosch fuel-pump is used and may be seen in the center of the picture. These engines weigh 1,439 and 1,460 pounds, respectively.

DON'T TURN THIS PAGE

YOUR PROFIT or loss as a fleet operator multiplies with miles. An important factor that determines whether it will be profit or loss is how well your fleet is maintained.

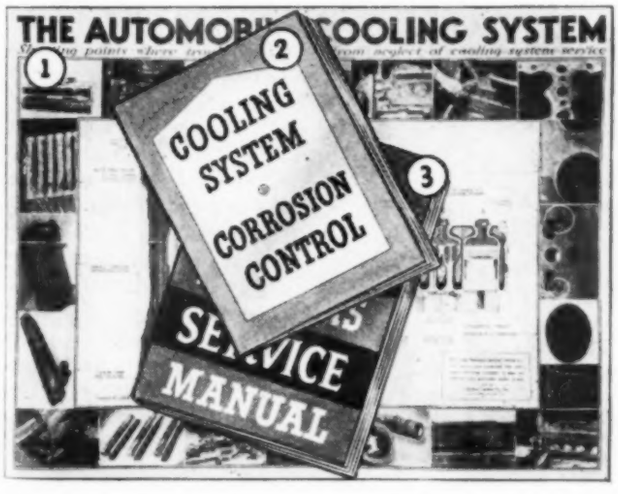
Cooling system troubles develop on a mileage basis. Once, when your units covered comparatively few miles a month, efficient cooling system service wasn't so important. But today, with units traveling 5,000 miles or more a month, it is vital that you maintain new-car cooling efficiency.

Field research has positively proved that practically all radiator clogging is caused by rust. A rusty cooling system means running "hot." It also means greater oil and gas consumption. And worse yet, it means loss of power, greater engine wear and heavier repair bills, all reflecting in higher operating costs that rob you of your income.

PERIODICAL flushing of cooling systems and radiator boil-out at one time were the only cure, but now Science has devised a better and less expensive method—*cooling system corrosion control*. Investigate this modern rust-preventing method and compare it with the cost of corrective flushing and cleaning service. Let us help you solve your cooling system problems. We have specialized on this subject, and particularly on the prevention of cooling system corrosion, over a period of years and have collected a great mass of data which we have found to be of value to fleet operators. Some of our most important findings on cooling problems have now been compiled for ready reference and are available to fleet operators for the asking. If you have any special cooling system problems a field service engineer will be available at your request.

UNTIL YOU'VE TAKEN ADVANTAGE OF THIS FREE OFFER!

Complete information on cooling system corrosion control. NOT advertising matter. It's yours for the asking. *You'll get*—**1.** A cooling system trouble chart showing clearly where troubles start. **2.** "Cooling System Corrosion Control" prepared expressly for fleet owners, telling of the new method of rust and corrosion prevention in fleet cooling systems. **3.** A cooling system servicing manual, well illustrated and written from the trouble angle.



SEND THIS COUPON

NATIONAL CARBON COMPANY, INC.,
P. O. Box 600, Grand Central Station,
New York, N. Y.

Please send me the free material listed above.

Name_____

Address_____

City_____ F.O. 11

We operate _____ trucks _____ passenger cars.
(Please fill in the number of trucks and passenger cars in your fleet.)

AUTOMOTIVE DIESEL ENGINES *(Continued)*

• HERCULES •

FOUR automotive Diesel engines are offered by Hercules Motors Corporation. These are known as Models DJXB, DJXC, DRXB and DHXB, all being six-cylinder jobs with overhead valves. Sizes and other specifications of these models appear in the specification table on page 27.

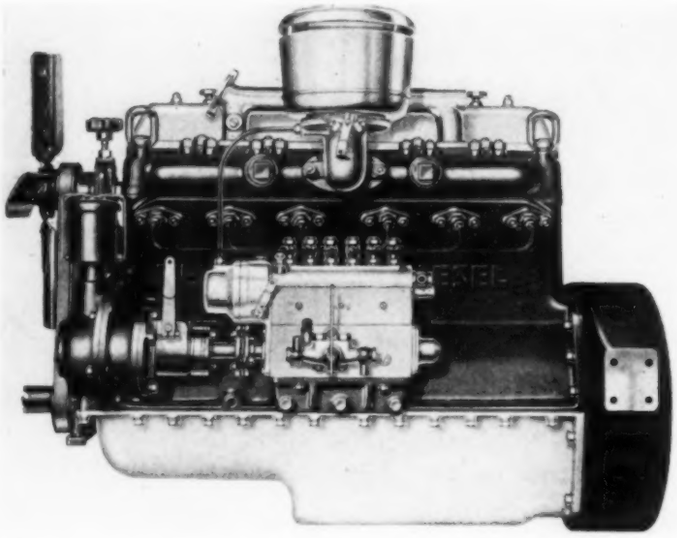
The feature of Hercules Diesels is their patented combustion chamber, one of which is inserted in the cylinder block at the side of each cylinder and directly below the head. The fuel is sprayed directly into this chamber of each cylinder, as each piston is completing its compression stroke. The temperature of the air thus compressed subsequently ignites the fuel as it is sprayed into the chamber, providing the expansion and power stroke.

In Hercules Diesels, combustion is started before the piston reaches top center and is completed at 20 degrees past top center, resulting, it is claimed, in a controlled, progressive burning that gives a very high expansion ratio while keeping maximum pressures within reasonable limits.

The combustion chamber, as you will note from the cutaway view, is spherical in shape and has a tangential passageway, opening into the side of the cylinder. As the piston reaches the end of its travel it closes the connecting passageway, thereby forcing the air through the aperture of reduced area with what is termed "cyclonic velocity," and providing the necessary turbulence.

Fuel injection occurs at approximately the end of the compression stroke in Hercules Diesels, and the beginning of the expansion stroke. While the piston is traveling on its compression stroke from approximately 18 degrees before top center, injection begins, and the fine fuel mist mixes with the whirling, hot, compressed air in the combustion chamber.

At approximately 10 degrees before top center, this air is so high in temperature that the fuel mist ignites and burns. Injection continues until the piston is approximately 14 degrees past top center and at 20 degrees past top center combustion is completed. Air intake and exhaust strokes are not unlike those in the conventional four-cycle gasoline engine.



Side view of Hercules DJXB, showing Bosch fuel-pump with built-in governor, injectors, intake manifold and air-cleaner. This is the smallest Hercules Diesel.

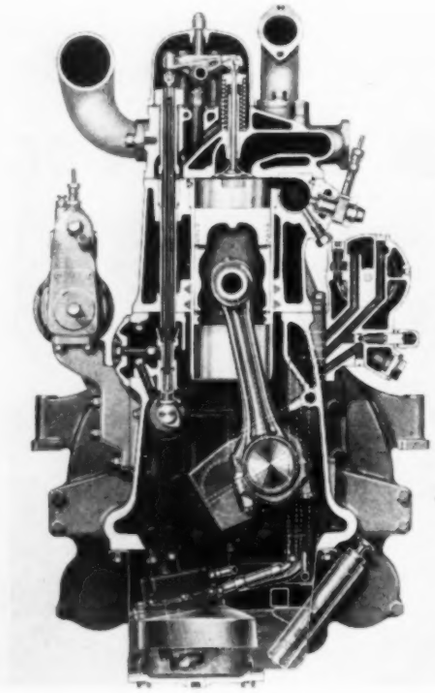
The time at which fuel injection begins is controlled by the timing of the fuel pump. In Hercules Diesels, the Bosch fuel pump is used, built with a governor as an integral part of the pump. The power developed by the engine is regulated by the quantity of fuel injected at each stroke of the fuel pump, and the quantity is regulated through the action of the governor, which lengthens or shortens the duration of fuel injection.

The Bosch fuel pump, as in other Diesel engines, operates off an accessory shaft and has a cam-operated pump-element for each cylinder. Fuel nozzles are of the pintle type and the fuel transfer pump is built integral with the fuel injection pump.

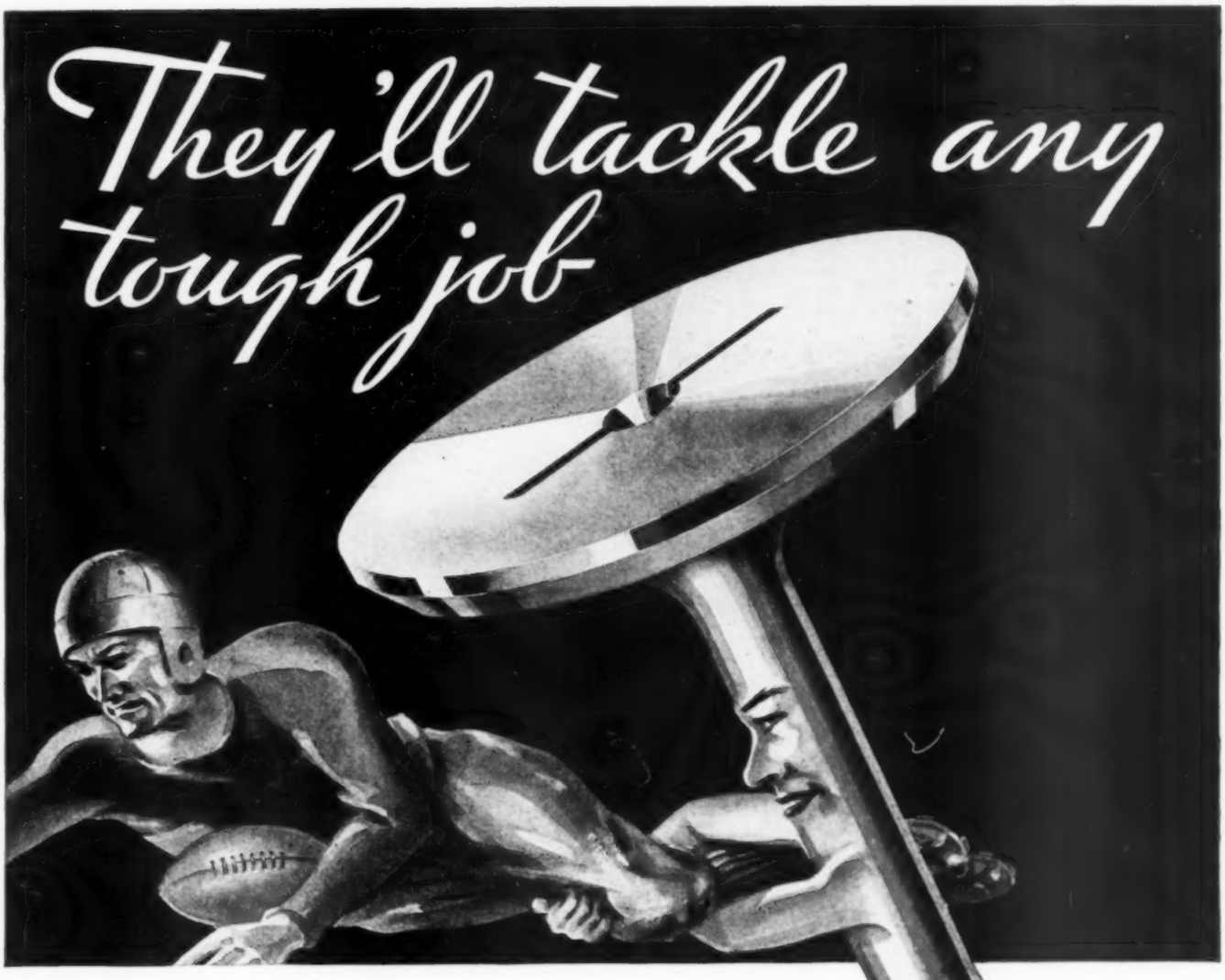
The general design of all four Hercules Diesels is similar. All have the patented combustion chamber and Bosch fuel injection equipment, as well as chrome-molybdenum crankshafts; crankcases cast integral with the cylinders; removable cylinder sleeves; aluminum alloy pistons; heat-treated chrome-molybdenum connecting-rods, rifle-drilled for lubrication to the pins; full-floating piston-pins; centrifugal water pumps; and full-pressure lubrication to all connecting rods, main bearings, piston-pins and rocker arm bushings.

Besides being equipped with standard engine mounting lugs, flywheel housings, etc., all Hercules Diesels are interchangeable, from an installation standpoint, with

(Please turn to page 65)



Cross-sectional view from front end of Hercules Diesel engines. This picture is representative of the two larger jobs, and pictures the lubrication system, patented combustion chamber, injectors, overhead-valves, manifolding and all moving parts. The Bosch fuel pump (end view) is mounted on your left side of this picture.



Put Toledo Super-Forged "Guaranteed" Valves in the toughest unit in your fleet. Watch the results, and it won't be long before your entire fleet is equipped with these superior valves. Made from extra tough, heat-resisting steel, and especially designed for today's high speed, high compression motors, Toledo Valves are *guaranteed* to deliver satisfaction. Your Toledo jobber has a complete stock.

GUARANTEE

Toledo "Type S" Super-Forged Valves are guaranteed. Your jobber will give you, without charge of any kind, a new valve in exchange for any Toledo "Type S" Super-Forged Valve which proves defective in service.

THE TOLEDO STEEL PRODUCTS COMPANY, TOLEDO, OHIO, U. S. A.

New York, 17 W. 60th Street • Chicago, 1225 South Wabash Avenue • Detroit, 5857 Forsythe • Atlanta, 279 Ivy St., N. E. • Dallas, 2805 Commerce Street • Kansas City, 14th and Oak Sts. • Los Angeles, 1341 South Hope Street • San Francisco, 520 Larkin St. • Portland, 408 N. W. 12th Ave. • *In Canada: The Toledo Steel Products Company, Ltd., 14 Breadalbane St., Toronto.*

TOLEDO

AUTOMOTIVE DIESEL ENGINES (Continued)

• WAUKESHA •

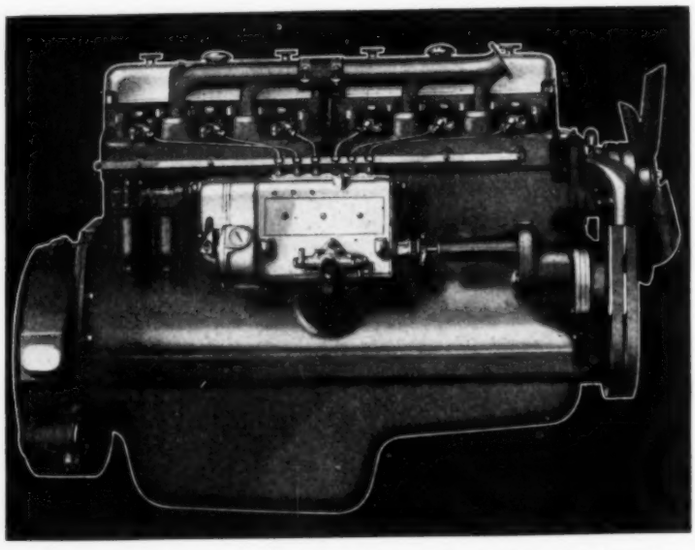
THREE Diesel engines are now being produced by Waukesha for automotive applications. The specifications may be found in the table which appears on page 27. The smallest is called the "Century Comet Six" and is designated as Model 6D-100-462, which obviously means "six cylinders, Diesel, 100 h.p., and 462 cu. in. displacement." Two larger engines are called "Silver Comet Sixes" and are designated as Models 6D-125-585, and 6D-140-648, for similarly obvious reasons.

A fourth Waukesha Diesel engine has just been announced, designated as Model 6D-80-278. This is a still smaller job, with bore and stroke of 3⅝ x 4¼ inches and a displacement of 278 cubic inches.

"Compression-ignition" is the modern name for oil engines operating on the Diesel principle. The Waukesha Comets belong to that class known as the "airless-injection, four-cycle, compression-ignition" type. The fuel is burned by forcing it into the air which has been taken in on the intake stroke, and compressed. The air is heated, by compression, to a temperature well above the ignition temperature of the fuel, so that automatic ignition occurs without separate sparking devices.

The Comet type of combustion chamber is said to be responsible for flexibility, clean burning and smoothness of operation. This combustion chamber was developed at the Ricardo Laboratory in England. Combustion is completed in a highly compact, spherical chamber into which nearly all the intake air charge is compressed. Thus, a great portion of the heat of combustion is held in the walls of the Comet chamber, to be added to the normal heat of compression with each fresh charge of air. This extra heat is claimed to start the combustion at the very beginning of fuel injection, so that the charge burns smoothly and progressively.

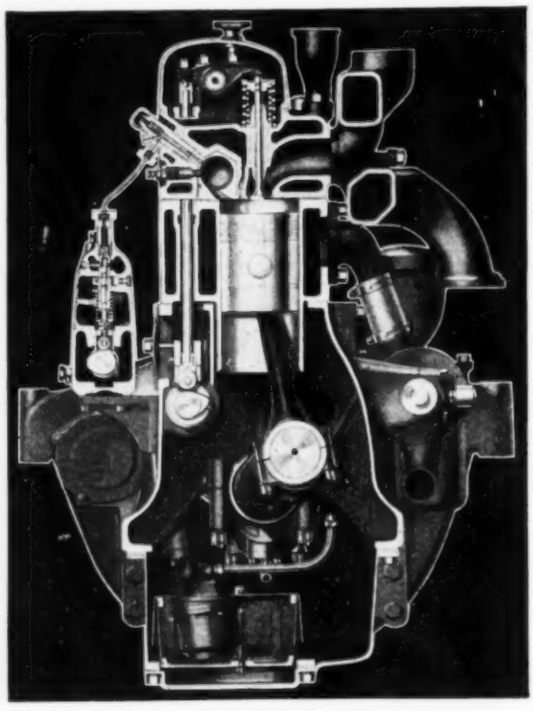
The fuel pump used is the Bosch, a single, self-contained unit with individual cylinders and plungers for each engine cylinder, and a metering mechanism to control the quantity of fuel injected at each stroke.



Fuel-injection side of Waukesha's "Silver Comet Six" Diesel engine, showing solid-injection Bosch fuel-pump, injectors, fuel oil filter and fuel supply pump.

Engine speeds are thus varied by the fuel pump itself, in conjunction with the governor and throttle. The centrifugal governor is entirely enclosed, lubricated by the fuel pump oiling system, and driven through the pump by the engine timing gears. It limits the maximum engine speed without interference with the accelerator or manual control at all intermediate speeds.

High pressure steel tubing leads the fuel from each cylinder of the pump to the individual injectors in each combustion chamber. The pintle type injectors have but one orifice, are spring loaded, and easily accessible for inspection and cleaning. Comet Diesels burn clean, refined fuel oils free from grit, low in sulphur, gum, acid and carbon, and having a viscosity of 35-80 seconds, Saybolt, at 100 degrees F., the makers state.



Typical Waukesha Comet Diesel engine in section showing non-rocking truncated cylinders, five ring aluminum piston, single piece Comet type combustion chamber insert, Bosch pintle injector, Bosch fuel pump, glow plug for cold weather starting, full pressure lubrication, and other characteristic Waukesha features.

Silver Comet Engines have seven bearing 3⅝" crankshafts, wet sleeve cylinders, five-ring aluminum alloy pistons, full floating piston pins with positive pressure lubrication to all moving parts. They can be started cold by electric starters furnished with the engines and, as shown in the illustration, are clean cut and free from complications. All standard accessories commonly used in automotive work can be applied, according to Waukesha engineers.

In addition to the features pointed out above, "glow plugs" are built into each combustion chamber insert, to facilitate starting under extreme conditions of cold weather. Additional maker's

(*Please turn to page* 65)

Turn ANY hauling problem over to the

Turn ANY hauling problem over to the FULL LINE of International Trucks

● Tens of thousands of men are doing just that today—*investing* their transportation dollars in International Trucks, for the soundest of practical reasons. Experience—the surest teacher in the world—has taught them that there is no substitute for International quality, stamina, and lasting satisfaction.

This line offers 26 distinct models in 70 different wheelbase lengths

Complete details will be sent upon request. Please write to the address below.

INTERNATIONAL HARVESTER COMPANY
of America (Incorporated)
606 So. Michigan Ave. Chicago, Illinois

INTERNATIONAL TRUCKS

If the job calls for a Truck . . .
it calls for an INTERNATIONAL

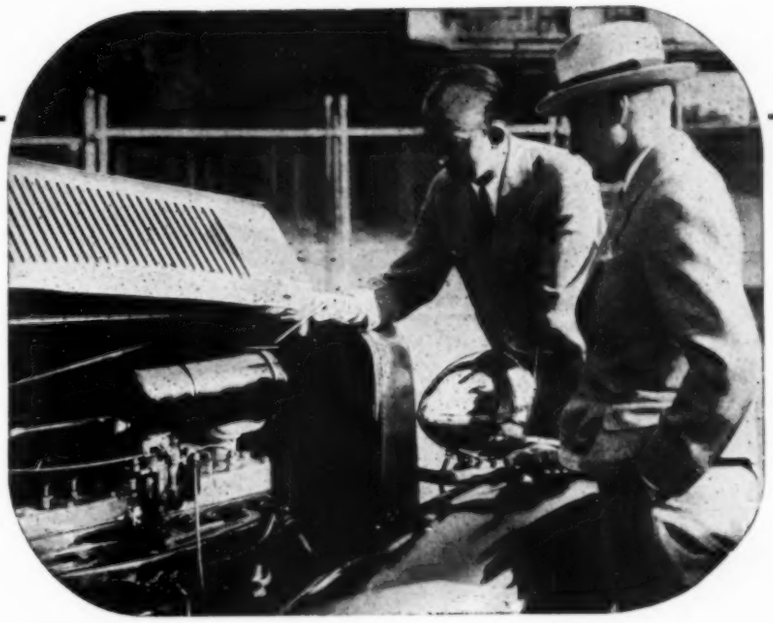
The truck illustrated is engaged in strip-coal mining. Two 4 to 5-ton International Trucks with gondola semi-trailers haul 500 tons daily from the mine up a 1700-ft. 7 per cent grade to the tipple.

● You would never accuse this truck of being a rebuilt passenger car. You can have the same confidence in every truck in the International line, from the beautiful ½-ton de luxe-delivery to the powerful 10-ton dump job. Every International Truck is a genuine reflection of the advanced engineering and design you would expect of 30 years of concentration on truck construction. And every International owner will give you emphatic testimony of truck-stamina and power . . . *plus* praise aplenty for economy in up-keep and operation that is music to any cost-record. An International dealer or any of the 230 Company-owned branches (U. S. and Canada) will be glad to discuss lower-cost transportation with you.

Dealers: The International franchise offers you an exceptional combination of quality trucks, attractive prices, a full range of sizes, and unequaled sales and service support through Company-owned branches. Write us direct, or ask the nearby branch for full details.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. OF AMERICA (*Incorporated*) Chicago, Illinois

INTERNATIONAL TRUCKS



How 87 Fleets Select Air-Cleaners

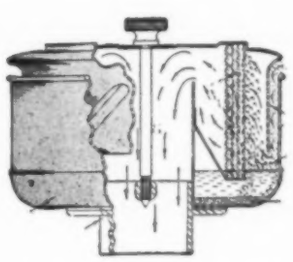
By H. Clay Fischer
Editor, FLEET OWNER

"RECENT dust-storms in various sections of the country have done more to make fleet operators "air-cleaner conscious" than all the efforts of salesmen, manufacturers, and advertisements put together." . . . Those are the words of a leading Eastern fleet operator. Your Editor picked them up (although not for publication) during a recent interview, in connection with Question No. 59 of our Question-of-the-Month Club, which covered the subject of Air-Cleaners.

We gained the impression, during our subsequent contacts with fleet men, that in a large majority of cases we would find fleets 100 percent equipped with air-cleaners, especially since we have always advocated their use on *every* vehicle and since most commercial jobs are now coming through with *some* kind of an air-cleaner as standard equipment.

What we found, on the other hand, was somewhat different, as the following brief resumé of our "survey" will indicate. By and large, however, there are comparatively very few fleet men who will not agree that an efficient air-cleaner should be used on *every* international-combustion engine, regardless of where such engine will be operated.

The response to Question No. 59 was *not so hot*, gentlemen. Only 87 operators "found the time, felt the inclination, or otherwise saw fit" to fill out the blank which appeared in our August issue, and mail it back to us. . . . Thank you, Gentlemen! . . . As is our usual custom, those 87 operators received their typewritten tabulations of all the replies. You fellows who did not participate in it will have to be satisfied with the brief resumé that follows. (We're not going to say any more about it, other than remark that a new questionnaire appears on page 53 of this issue, and we'd appreciate a greater response, now that vacation days are over, the weather is cooler and more time is being spent, generally, for reading and study.)



Sectional view of typical oil-bath air-cleaner, which, fleet men say, is the most efficient type of air-cleaner for fleet work.

In making up questionnaires of this kind, experience dictates that it is always best to start off with an "easy" question, and spring the more difficult ones later on, so we first asked, *"What percentage of the vehicles in your fleet are now equipped with air-cleaners?"* . . . Imagine our embarrassment, when we found that in only 38 fleets (out of our 87) are air-cleaners being used 100 percent—or on *every* vehicle. . . . But it's not so bad, after all, since only 2 fleets report that they do not use air-cleaners at all; and the other 46 operators who answered this question report that they *do* use air-cleaners, but not on all vehicles.

These latter fleet men gave various figures; from 20 percent to 98 percent of their vehicles being equipped with *some* kind of an air-cleaner. Offhand, and without stopping to figure out the average, we would say that a large majority of the operators who participated in this survey, have air-cleaners on considerably better than 50 percent of their vehicles.

The second question, also an easy one, will probably prove more interesting to you. We asked, *"Do you install air-cleaners on all vehicles, when they are not supplied as*

standard equipment?" . . . Fifty operators replied in the affirmative. Two operators said "Sometimes"; and thirty operators said "No"; while five did not answer this one. . . . These answers probably account for the lack of air-cleaners on some of the vehicles as reported in our first question. . . . Obviously, the answers should have been "Yes" from all 87 operators, to our minds, and sometime, we hope, *all* operators will be in a position to report that their fleets are 100 percent air-cleaner equipped. . . . All that we can do now is to agree with the air-cleaner advocates, who insist that *every* vehicle should have one, regardless of where and how it is operated.

The controversy began to get warm, when we next asked, "*If so, what make or type of air-cleaner do you specify?*" . . . Eight different makes, and three different types of air-cleaners were given, in answer to this question, including some of both the well-known and not-so-well-known makes of air-cleaners, but we must withhold this juicy morsel of information, saving it only for those who were interested enough to participate in our questionnaire.

The same thing is true of another question which we asked, "*Which makes of air-cleaners are you now using?*" . . . However, in reviewing the answers to this one, little was left to our imagination, since practically *every* make of air-cleaner was mentioned. The relative standing of the makes in this last question will probably not mean very much to the analytical fleet operator, since he will perhaps say: "Sure, a lot of air-cleaners were just wished on us operators when we bought the vehicles; they were not optional in most cases; and another thing, a lot of operators bought one or two air-cleaners from *everybody*, for test purposes, so the answers to that question do not mean very much to us." (Remember, it is not we who are saying that; that's probably what Mr. Average Fleet Man would remark.)

However, the list of *makes* of air-cleaners which fleet men are now using will probably be of *some* interest, since it shows which make of air-cleaner predominates (numerically) and all of this dope is given in our typewritten tabulation, free to fleet operators on request.

The real, "meaty" question was asked next, when we inquired, "*Which MAKE of air-cleaner, in your opinion, is best for fleet operators, and why?*" . . . Varying answers were received. However, a few makes were mentioned so often that they seem to be truly outstanding in the field of fleet operation. And the interesting thing about it is that some of these makes are comparatively new, some of them are without benefit of national advertising, and some of them are practically unknown in certain sections of the country. . . . All of which leads us to believe that they are *good* air-cleaners and will do the job properly for the somewhat critical fleet maintenance man.

We are not going to mention any names in this article, but if you would like to get a copy of our mimeographed summary, which *does* give this information, you can get a copy by asking Brother Fischer for one, and at the same time promising him cooperation in future questionnaires. That's fair enough, is it not?

And here is another question that revealed a new trend. We asked, "*Do you use air-cleaners on crankcase breathers, too?*" . . . Twenty operators reported that they use air-cleaners on *all* crankcase breathers, whether standard equipment or not; eighteen fleet men use air-cleaners on some breathers, but not in all cases; forty-six operators don't use them at all on crankcase breathers; and three fleet men did not answer this question.

We always anticipate that some fleet operators will prefer to refrain from mentioning trade-names, and in answer to some of the previous questions, it was not unusual for several of the replies to include *types* of air-cleaners, instead of *makes*. We believe it is not unethical to tell you here that wherever a type was mentioned as being preferred, you can rest assured that it was the "oil-bath" or "oil-reservoir" type.

Installation view of typical oil-bath air-cleaner, as installed on State Highway Department vehicle. The oil-bath type of air-cleaner seems to be preferred, over all other types, by discriminating fleet men.

Having this in mind, we were foresighted enough to include as our next question: "*Which TYPE of air-cleaner, in your opinion, is best for fleet operators?*" . . . These answers we feel that we *can* give you, and here they are: Fifty-five fleets prefer the oil-bath or oil-reservoir type; twenty-five mentioned the wetted-metal-mesh type as their choice; while only five fleet men were noted to prefer the centrifugal type of air-cleaner. And two did not answer this question. . . . So there are the answers, boys; read 'em and be guided accordingly.

"*Do you think that it pays to use air-cleaners in your fleet, considering all costs?*" . . . That was the next question, and our chest was observed to swell with pride when we learned that seventy-seven fleet men replied, "Yes." . . . Only five operators reported that, in their opinions, the cost of air-cleaners was not justified; and five more did not answer the question. . . . It is interesting to note, in this connection, that many operators added the remark, "Provided that they are properly serviced." Will you forgive us if we take this opportunity of saying, "We told you so!"

Another question asked, "*How*

NEW CHEVROLET TRUCKS

You are cordially invited to attend a

SPECIAL EXHIBIT OF NEW CHEVROLET TRUCKS

Accept this invitation to visit your Chevrolet dealer and a special exhibit of new Chevrolet trucks. Ask for complete details of new Chevrolet truck features that offer important economies to truck Fleet Owners.

The new Chevrolet trucks are more powerful, more rugged, thoroughly modern in appearance—and still the world's lowest priced trucks.

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN

Compare Chevrolet's low delivered prices and easy G. M. A. C. terms. A General Motors Value

THE WORLD'S LOWEST PRICED TRUCKS

THE AIR CLEANER "PICTURE" *in* FLEETS (Continued)

often do you ordinarily clean out your air-cleaners?" The answers to this question varied so greatly that we are not going to give them here. . . . But if you are interested in knowing this, you can always refer to the typewritten tabulation. . . . And if you haven't got one, Brother Fischer will oblige, if you will promise to participate in our future questionnaires.

We also asked the question: *"Do you find that air-cleaners lengthen engine life?"* . . . Seventy-two operators said "Yes"; 5 said "No"; and 10 did not answer. . . . Under ordinary circumstances, and according to all of the rules of the game, air-cleaners *should* lengthen engine life, again, *if properly and regularly serviced!*

"Do you find that air-cleaners lengthen oil life?" was another question. . . . Here, however, many operators *believed* that they do, but did not have positive proof. . . . Forty-two operators said "Yes"; 19 said "No"; and 26 did not answer. Of those who answered in the affirmative, many did not have accurate records to back up their contentions, but those who did, offered proof to the tune of figures as high as 400% more oil life. The remarks, for the most part, indicated that air-cleaners are a *good* investment, again, *provided that they are properly and regularly serviced!* Only a very few fleet men hold the opinion that air-cleaners cause an increase in gasoline consumption; and a few more did not seem to think that it made much difference whether or not an air-cleaner was used.

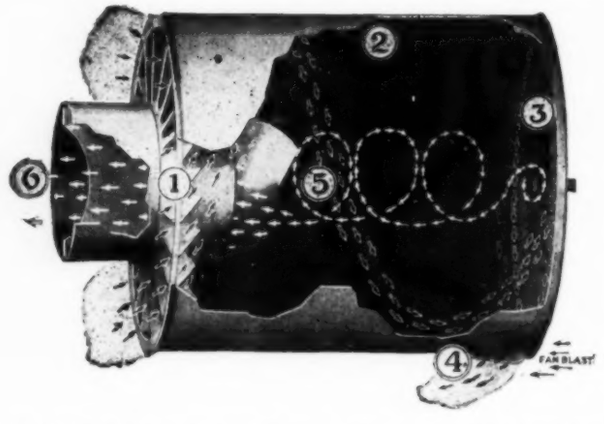
Rather than present the various remarks in a rambling fashion, let's reproduce here, some of those that are of most pertinent interest, and some of those that appeared quite often. Your Editor has painstakingly waded through all of the replies, and the following remarks are quoted as they appeared on the questionnaires. Here they are, for your convenience:

"Air-cleaners are far more important than oil-filters."

"We find that air-cleaners lengthen engine life on our trucks."

"Grading equipment will not operate a week without an air-cleaner."

Second choice among fleet men is the wetted-metal-mesh type of air-cleaner, a typical one of which is shown here in cross-section.



And here is the centrifugal type of air-cleaner, which does not seem to have a great many followers among automotive fleet men, since only five operators preferred it.

"We find 75% less carburetor trouble when air-cleaners are used."

"Best to use air-cleaners in conjunction with oil-filters."

"On trucks in West, we use every possible air-cleaning precaution."

"Air-cleaners help us get 35,000 miles per set of rings."

"Oil-bath cleaners, cleaned daily, helped during dust storms."

"We do have a real battle with dust, due to dirt roads."

"Oil is much dirtier on motors not equipped with air-cleaners."

"We find no difference—with or without air-cleaners."

"Air-cleaners must be serviced regularly; otherwise no good."

"We now install air-cleaners on every new job purchased."

"A dirty air-cleaner is a liability; must clean them regularly."

"Oil-bath is best type; mesh and centrifugal types worthless."

"We have three of the old type air-cleaners; not worth much."

"We have 2 to 3 inches of dust and coal dirt in dry weather."

"In dry weather we service air-cleaners daily on dusty roads."

"Believe oil-reservoir type best for excessive dust conditions."

"Doubtful if air-cleaners are necessary in city use."

"Without cleaners, cars would have been ruined in dust storms."

"Air-cleaner is best investment in motor accessories."

"We follow factory's advice on air-cleaner equipment."

No discussion on the subject of air-cleaners would be complete without an inquiry into the subject of dust-storms. . . . We always thought that dust-storms were strictly a *local* problem, and *not* one of national importance. And that's why we did not get all hot-and-bothered about it, when certain sections of the country were literally "buried in dust" some several months ago. . . . And our face wasn't a bit red when one of our worthy contemporaries made quite an issue of the dust-storm subject, while we felt content to delve into other matters of more national importance, such as the insurance

(*Please turn to page* 67)

"OUR FLEET CHANGED JUST ONE TIRE ON THE ROAD IN TWO YEARS"

says **Wm. H. Brownell,** *President*
Buskirk Trucking Corporation
Buskirk, New York

Milk Hauler's Mileage More Than Tripled with Silvertowns

Milk is the cargo. Delivery is 190 miles away. Loads *must* arrive on time. That's the job of the Buskirk Trucking Corporation. And there's no allowance for tire delays on the running schedule!

Because the 12 big tank trucks must get through in all kinds of weather, they depend on Goodrich Triple Protected Silvertowns. And Silvertowns never let them down.

Listen to this—Mr. Wm. H. Brownell says: "We have never had a premature failure with Triple Protected Silvertowns. We used to average 20,000 miles per tire. After a trial, we changed to Goodrich Silvertowns and are now averaging 70,000 miles on all our units."

HOW OWNERS OF ½-TON TRUCKS CAN SAVE MONEY

Here's a new kind of tire for half-ton trucks. It's the Goodrich "Commercial 15"—a low pressure tire with all the advantages of a truck tire and automobile tire combined. Cushions the load, gives longer mileage, provides blow-out protection and non-skid safety. Ask to see the "Commercial 15"—the smartest-looking tire ever built for delivery trucks.

You get the *full* mileage you pay for when you buy Goodrich Tires. You avoid unnecessary sidewall failures that cut the heart out of tire life. A new invention in the sidewall actually checks 80% of premature failures. This sidewall protection—this Triple Protection—prevents a big cause of blow-outs—cuts down delays—slashes tire costs. Only Goodrich offers this 3-way protection:

1 PLYFLEX—a *new*, tough, sturdy rubber material with greater resistance to stretch. A layer of Plyflex in the sidewall prevents ply separation—distributes stresses—checks local weakness.

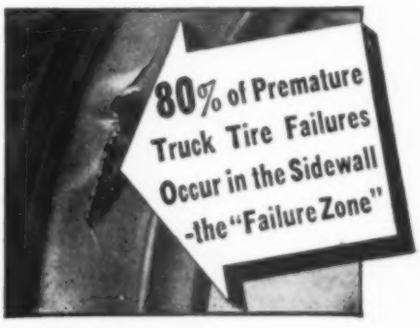
2 PLY-LOCK—the new Goodrich way of *locking* the plies about the bead. Anchoring them in place. Positive protection against the short plies tearing loose above the bead.

3 100% FULL-FLOATING CORD—Each cord is surrounded by rubber. With ordinary cross-woven fabric, when the cords touch each other, they rub—get hot—break. In Silvertowns, there are no cross cords. No friction.

It's just plain common sense to insist on this protection when you buy truck tires! It costs you nothing extra!

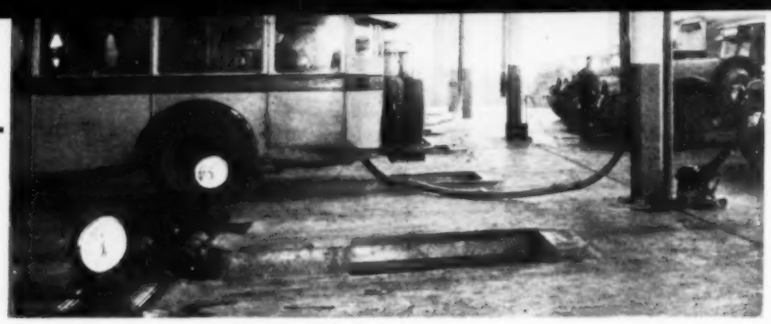
FREE! TRUCK OPERATOR'S MANUAL

This big 44-page pocket size handbook is crammed with money-saving information for truckers and drivers. Gives weights of commodities, tire load capacities, dual spacing charts, load analysis, etc. No obligation. Write for free copy. Address Dept. T-103, The B. F. Goodrich Co., Akron, Ohio.



Goodrich *Triple Protected* Silvertowns

SPECIFY THESE NEW SILVERTOWN TIRES FOR TRUCKS AND BUSES



Choosing Friction Materials?

IF that is part of your job, and if Brake Lining is one of them, here's an interesting analysis of what you should expect in your quest for the "ideal" brake lining. . . . This advice comes from Roy Berg, Chief Engineer for Johns-Manville, but don't let that stop you from reading it, as it contains no puffs about ANYBODY'S brake lining. . . . Just a non-technical treatise, to keep you up-to-date.—H. C. F.

IN considering the selection of friction materials to work on any type of vehicle, there are four principal characteristics one should always keep in mind. These primary factors are:

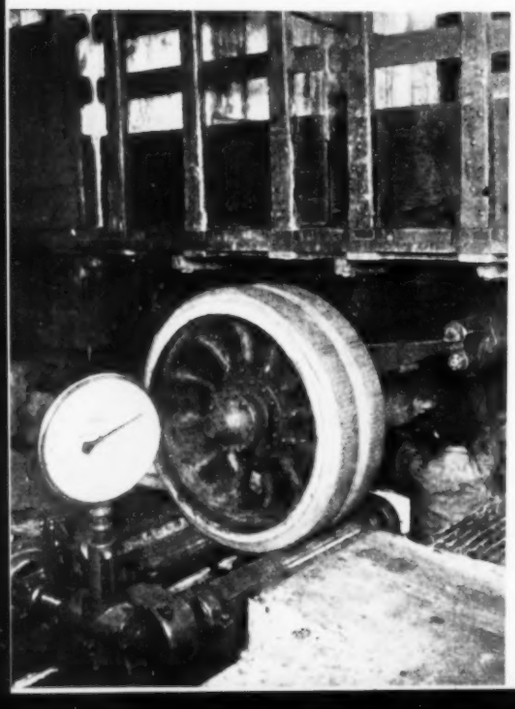
1) Friction Level.
2) Durability.
3) Scoring Tendencies.
4) Quietness.

Let us first discuss the cardinal function, Friction Level, and insert the detailed items that go to make up perfection in performance so far as friction alone is concerned.

A lining, if it is perfect with respect to friction level, should show no variation in its coefficient of friction whether the lining is new or old, hot or cold, wet or dry, or lubricated with an oil film.

We are not concerned here about the height of the friction level; we may be speaking of a low-friction lining or a high-friction lining, whichever the particular vehicle under consideration requires. Whatever the requirement in friction is, the "perfect" lining (yet to be found) will not display variations under the conditions just enumerated.

The solution to the problem of producing a lining that will show no variation between its new and old condition, is not easy of accomplishment but it *can* be done. Likewise a solution exists within certain temperature limits for producing a lining that will show no variation in its coefficient between hot and cold temperatures. By "hot" we mean temperatures up to approximately 450° to 500° F.



It is also possible to produce in the laboratory a lining that will show no variation in coefficient of friction, when lubricated completely to the point of saturation with a continuous film of water, and which will show no variation as the water film becomes dispelled from pressure and loss through evaporation from temperature. But, despite the claims which are sometimes made, we have never seen commercially available linings that were immune from frictional variation when saturated to completion with a continuous water film.

No amount of argument will successfully dispel a continuous water film between lining and drum. The true fact is that this continuous film acts as a lubricant and therefore tends to reduce the coefficient of friction.

It is possible to produce linings that will overcome this particular characteristic by the introduction of abrasives, but the wisdom of such a step is certainly of questionable value because the most thorough investigation has shown that there inevitably results from such inclusions a rise in friction-coefficient with age.

Quantities of lubricating oil or grease accidentally slopped over to the brake drum have a bad effect on *any* kind of lining. We appreciate that there are many claims made about linings and their performance, operated in the presence of grease or oil but we have yet to see a lining whose performance characteristics are absolutely immune from oil or grease films.

Let us next consider the primary quality of durability. How long should a good lining last? Before delving into this question, let us first consider that friction materials are made up of a number of inorganic ingredients, one of which is usually asbestos fibre, and all of these inorganic materials are bonded together with something of an organic nature. These materials used as a bond may very well take us through the whole realm of everything that might conceivably be classed as a "plastic."

We find in the realm of binding materials used for friction materials such plastics as asphalts, coal-tars, drying oils such as china-wood, or tung-oil, and linseed and other organic oils, rubber, synthetic resins, gums and pitches; any or all of which may be used singly or in combination in varying quantities. These plastics or binders are all subject to disintegration from temperature.

As the speed of vehicles has increased rapidly during the last few years brake temperature has also increased. With some types of brakes on vehicles, the increase in braking temperatures has been enormous. High temperatures cannot help but produce a destructive effect upon the binders used to hold friction materials together. As

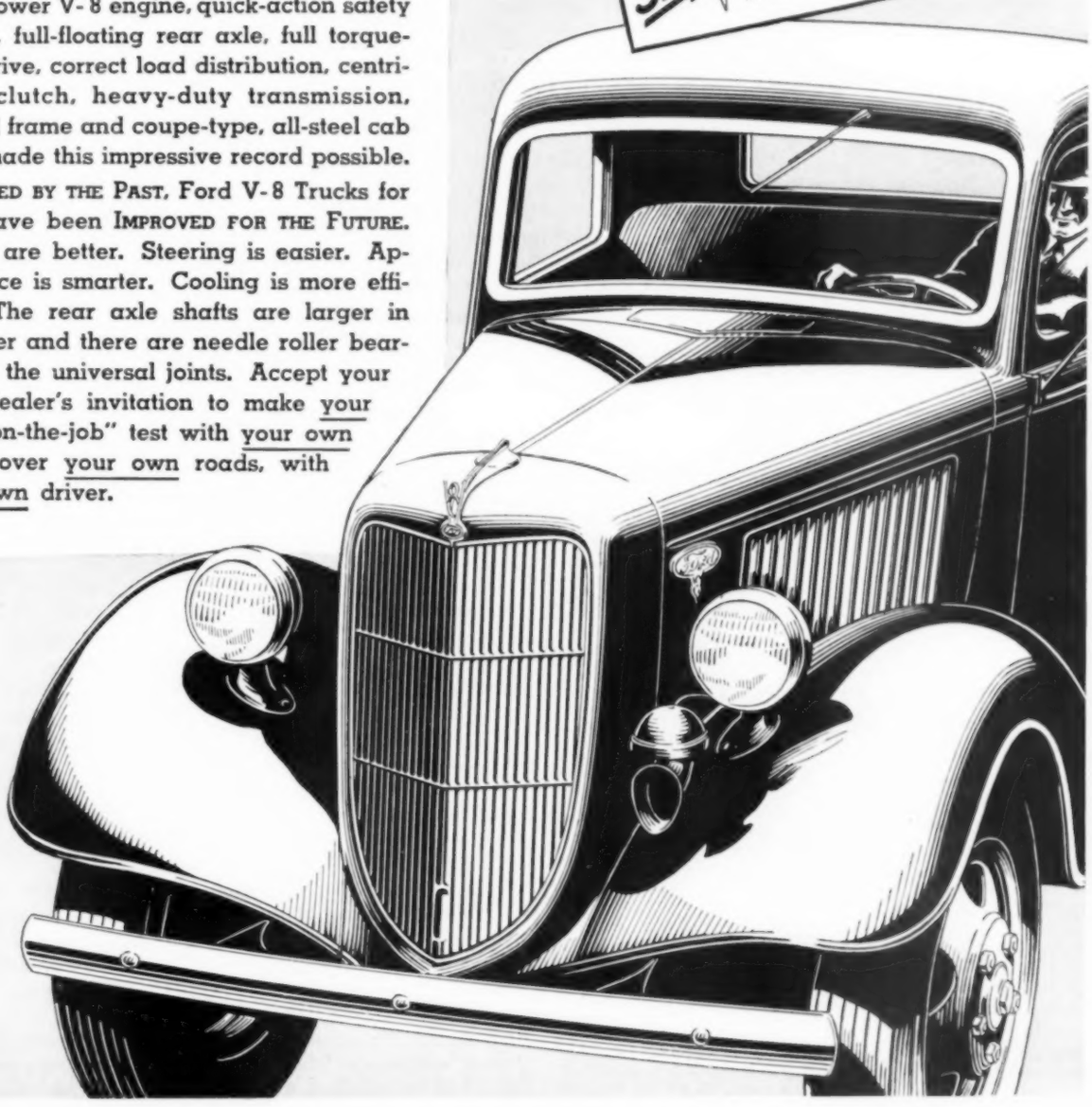
THE 1936
FORD V-8
TRUCKS AND COMMERCIAL CARS

OWNERS of more than 300,000 Ford V-8 Trucks and Commercial Cars have proved V-8 economy, reliability and performance in BILLIONS OF MILES of service under every condition of load, road and weather.

Such quality truck features as the 80-horsepower V-8 engine, quick-action safety brakes, full-floating rear axle, full torque-tube drive, correct load distribution, centri-force clutch, heavy-duty transmission, rugged frame and coupe-type, all-steel cab have made this impressive record possible.

PROVED BY THE PAST, Ford V-8 Trucks for 1936 have been IMPROVED FOR THE FUTURE. Brakes are better. Steering is easier. Appearance is smarter. Cooling is more efficient. The rear axle shafts are larger in diameter and there are needle roller bearings in the universal joints. Accept your Ford dealer's invitation to make your own "on-the-job" test with your own loads, over your own roads, with your own driver.

Proved BY THE PAST
Improved FOR THE FUTURE



these binders disintegrate or decompose, so do our linings wear out.

Let us consider the curve that is shown in Figure I at the top of the page. The relations established by this curve are approximate. They do not represent the performance of any *one* manufacturer's lining but rather they represent what might be expected of todays good linings collectively. The curve is simply shown to emphasize that if our brakes operate at cool temperatures we can expect longer life. But if we subject brake linings to extremely high temperatures continuously applied, destruction of the lining will go on at an accelerated pace.

Immediately below the main curve on this plot is shown on dotted lines another curve which illustrates the performance obtained from linings of ten years ago. The difference between these two curves represents the improvement, broadly speaking, obtained by the friction materials industry through the improvements made in binders.

It is altogether possible to pick out from the broad field of motor vehicle operation certain classes of operating conditions and assign the positions of these various services to their relative place on the durability temperature curve, thus for example, we find certain relations between temperature and wear, as expressed in Table I. The decimal dimension given in Table I represents the number of thousandths of an inch which will wear off from the lining per thousand miles of service.

The differences for each type of vehicle are a direct result of temperature variations in the particular operating condition for a particular vehicle. Thus, we might find one taxicab with a careful driver applying his brakes in the most gentle fashion, coasting to a stop whenever possible, getting the very best life from his linings. And we might also find in the same fleet an identical car operating over the same roads, a driver who accelerates at a furious pace and applies his brakes viciously, always stopping on the proverbial dime. From this driver we can very well expect the maximum rate of wear. The variation in driving conditions between these two described vehicles simply places these cars in different positions in the temperature curve.

In one case the binder is not subjected to the extreme temperatures and the life is accordingly good. In the other case the brakes are always red hot, the binder is being continuously "cooked" and short life is the inevitable result.

Scoring tendencies of friction materials have for years been troublesome problems but today this disturbing factor of performance can be very easily controlled. A "perfect" lining with respect to scoring is one that will not score under all the variable conditions described under Friction Level, on any kind of a drum irrespective of its metallurgical composition whether steel or iron. Under the general heading of scoring tendencies, the objectionable factor of drum "checking" should also be included, and it can be said that drum "checking," while not a factor directly related to the action of the friction material, can nevertheless be very largely brought under the control of the friction material.

The very important factor of quietness in a friction material is one that does not result from any helter-skelter or accidental selection of ingredients — squeaks, squeals, groans and chatters—each represent a particular and distinct noise which may emanate from a brake. Recognition must of course be given to the fact that any one of these types of noises can be produced from mal-adjustment or from the faulty surfacing of a brake drum or from innumerable other extraneous mechanical conditions.

Notwithstanding all these outside influences, it is possible to make brake linings which under the most ideal operating conditions and the most precise adjustments possible, will display every objectionable noise. And, conversely, by a wise and experienced selection of binders and ingredients, no noise will result and we might even go so far as to say that should the operating conditions become severe, either from mal-adjustment or hard usage, that these same ingredients would still operate quietly.

Now, we have discussed in the above these four primary perform-

(*Please turn to page* 71)

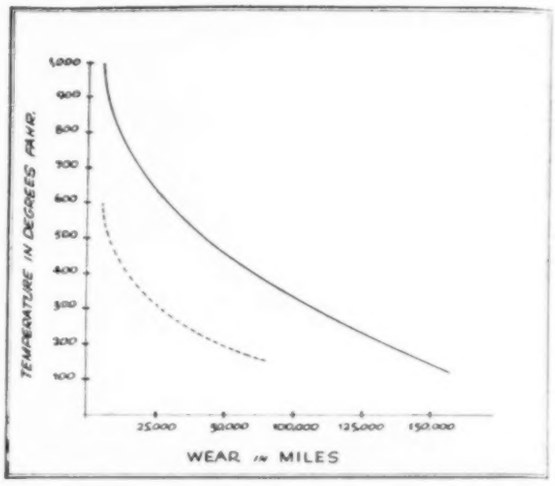


FIGURE I. . . . The large solid curve represents no particular brake lining. It simply accentuates the fact that brake lining life is largely dependent on operating temperature. . . . The mileages shown are what we should get with good linings of today. . . . The small broken curve represents the same thing, except that it applies to linings of about ten years ago.

TABLE I

Relative Rate of Brake Lining Wear, per 1,000 Miles of Average Operation *

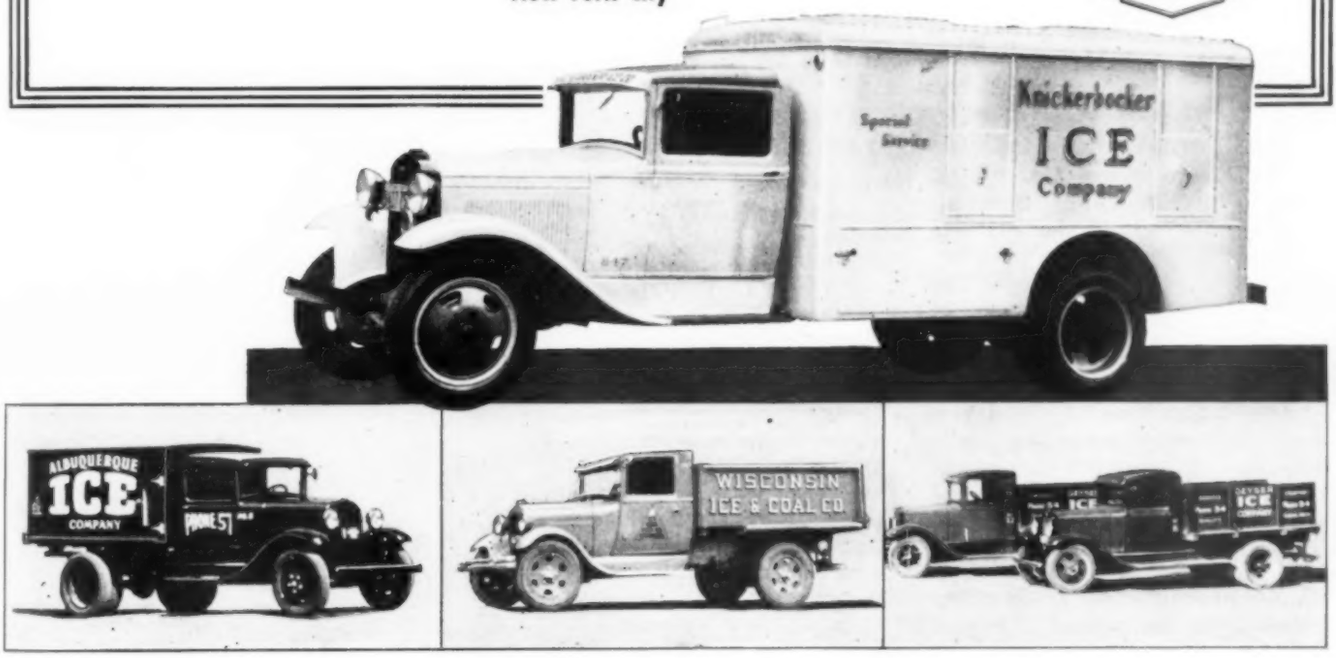
Vehicles	Minimum Low Temperature	Maximum High Temperature
Cars	.001"	.010"
Taxis	.002"	.010"
Trucks	.003"	.033"
Buses	.003"	.033"

* Note: The above table does not refer to any one make of brake lining, nor any one fleet operation. . . . It simply shows the positions of various types of vehicles on the durability-temperature curve illustrated above.

HOW much brake lining wear should there be for each 1,000 miles of operation? . . . Nobody can average this condition and get a figure that will mean anything, since there are so many variables in vehicle operation. . . . However, there is a definite relation between heat and wear, and that's primarily what the above table tries to bring out.

ICE AND COAL MEN TELL US "SHERWIN-WILLIAMS KEM TRANSPORT ENAMELS MAKE OUR TRUCKS A SPLENDID ADVERTISING MEDIUM"

—Knickerbocker Ice Co.,
New York City



Sherwin-Williams Kem Transport Enamel stands up under the severest of service and weather conditions. Whether used on ice trucks that are constantly damp and "salty"—or on coal trucks that are everlastingly exposed to coal dust—S-W Kem Transport Enamel can "take it" without flinching. Its porcelain-like, glossy finish is washable, easy to keep clean—and comes up smiling every time.

Sherwin-Williams Kem Transport Enamel covers solid in one coat, even when reduced 33⅓% to 40% for spraying. A double coat may be sprayed in one continuous operation. It handles faster, hides better, levels smoothly and dries overnight to a beautiful lustre *without rubbing or polishing.* Thus, both material and labor costs are reduced. Its durability and bright, glossy finish require less maintenance, keeping truck fleets on the road and out of the refinishing shop . . . attractive traveling billboards—the utmost in favorable advertising value all year 'round.

Try Sherwin-Williams Kem Transport Enamel on your next refinishing job. You'll be delighted at its splendid showing. The Sherwin-Williams Co., Dept. 623, Cleveland, Ohio.

SHERWIN-WILLIAMS KEM TRANSPORT ENAMELS

Why *Your* Dollar *Buys* More Truck Today

THIS analysis of today's motor truck offerings as compared with those of seven short years ago, is presented to prove a case that hardly needs proving. . . . Regardless of which make of truck you choose, you'll find similar reductions and improvements all the way down the line. . . . And today's truck sales substantiate it!—H. C. F.

●

ABOVE are shown two typical 1½-ton trucks of different vintages. The one at the left is a 1928 model, representing an average value of seven years ago. The one at the right is a 1935 model of the same make, equipped for the same line of business (perishable foodstuffs).

Little explanation of the difference is necessary, since practically every fleet operator is aware of the tremendous strides made by the truck manufacturers (and we mean all of them) during the past seven years.

These improvements are very important from a practical viewpoint since they include both power and load-carrying capacity, which are the primary requirements of the motor truck. It is a fact that a truck which, today, costs little more than half as much as it did a few years ago will carry a load three times as great.

Much of this tremendous saving in cost of truck operation results, through competition, in lowered

By E. W. Winans

Chief Engr., Federal Motor Truck Co., Detroit, Mich.

freight costs to the manufacturer or wholesaler who in turn passes it on to the retailer. The general public benefits in the end. In fact, the public benefits by practically every improvement in motor trucks, because of the way they have geared themselves to everyday American life.

It is very interesting to look back, even so short a time as seven years, and consider what the man who then bought a motor truck received for his money. At that time a typical one-ton truck cost in the neighborhood of $1,000. It had four cylinders of very moderate horse power, weighed about 2,400 pounds, had a gross capacity of 5,100 pounds and would satisfactorily carry about one ton—not much more. That's what the customer got for his money—and liked it, too.

Today a similar chassis is called a 1½-ton truck and costs in the neighborhood of $600. It has a gross rating of twice as much as the 1928 truck (11,000 pounds) and, even when loaded to its rated capacity, will carry three tons and is sometimes forced to stagger along under a good deal more.

In other words, a truck which can be purchased for 40 per cent less money today will carry three times as much as the truck costing $1,000 seven years ago.

Then compare the daily mileage demanded of these trucks. Records show an average of 40 miles per day in 1928, while in 1935, 400 miles per day is not uncommon.

Now these changes did not happen in a day, but are the result of years of continuous improvement in engineering design and materials and in the painstaking care in manufacturing methods, and it

(*Please turn to page* 62)

TABLE I—COMPARISON OF CHASSIS FEATURES AND PRICE SINCE 1928

Year	Price	Engine Cu. In. Displacement	Chassis Weight Lbs.	Price Per Lb. Chassis	Gross Capacity Lbs.	Pay-load Lbs.	Price per Lb. of Payload
1928	$1000	173	2400	$.42	5150	2000	$.50
1929	995	173	2725	$.37	5475	2000	$.49
1930	980	173	2975	$.33	7000	3025	$.32
1931	895	215	3225	$.28	8500	4100	$.22
1932	695	215	3225	$.22	8500	4100	$.17
1933	695	228	3500	$.20	10000	5100	$.14
1934	645	228	3500	$.18	10000	5100	$.13
1935	645	228	3500	$.18	11000	6100	$.10

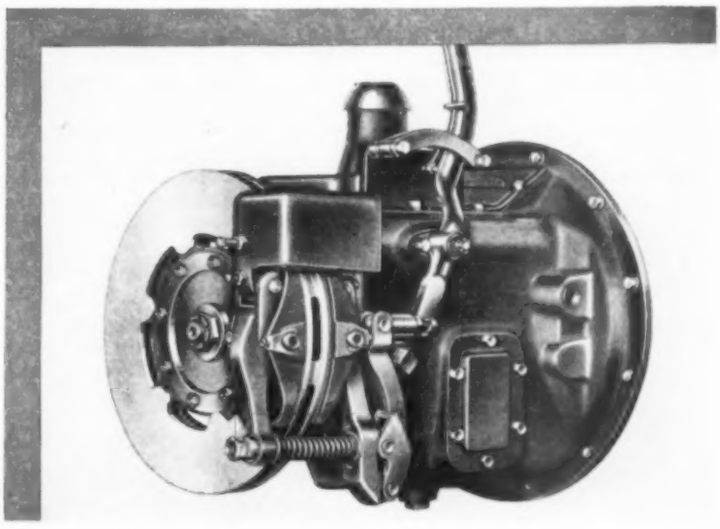
..you need the protection of **TRU-STOP Brakes**

● You provide well for your responsibilities to the public and to your own business when you install TRU-STOP Emergency Brakes on your trucks. Then you give each driver a positive means of stopping a heavily loaded truck—rapidly, but as smoothly as he would stop a fine new passenger car.

The growing accident rate makes the installation of TRU-STOP Emergency Brakes a good business move. With TRU-STOPS on your cars you know that you have complied with the most rigid brake requirements of the various states—exceeded these requirements, as a matter of fact, by a liberal margin.

When the U. S. Army wanted the best emergency brakes, TRU-STOPS were chosen—after severe tests with 2½-ton trucks on a 57% grade.

Give us the facts about your equipment and driving conditions. We may be able to make some valuable suggestions.



Perfect Service . . Easy Maintenance

TRU-STOP Emergency Brakes operate without chattering or grabbing. Lining surfaces wear uniformly because braking pressure is evenly distributed. Heat generated in braking is quickly dissipated in the ventilated discs. Require very little adjustment or service work. Any driver can reline in a few minutes.

AMERICAN CABLE COMPANY, Inc.

ACCO

Automotive Division, Bridgeport, Connecticut

An Associate Company of the American Chain Co., Inc.

IN BUSINESS FOR YOUR SAFETY

TRU•STOP EMERGENCY BRAKE

LETTERS

TO THE EDITOR

OIL FILTER SURVEY HELPS

● *Dear Mr. Fischer:* We thank you most kindly for the attention which you gave to the matter of oil filters in our behalf. We received the summary of the survey and were pleased with the thorough job which you made of it.

The whole question is now quite clear to us, and we shall proceed to install a few oil filters as an experiment, and then, of course, we will be guided by the results of our own experience.

We thank you again for your courtesy in this connection.—*Morris Kellerman, Pres., American Lending Library, Inc., College Point, N. Y.*

●

STOCK VS. MUTUAL?

● *To the Editor:* We, also, have heard many arguments, pro and con, on the subject of Stock vs. Mutual Insurance Companies. And we were just on the point of switching from stock to mutual, when the insurance survey in a recent issue of FLEET OWNER caught our eye.

So, if you don't mind, how about telling us why there seems to be such an overwhelming preference for stock companies, in placing casualty insurance on automotive vehicles.—*Briarcliff Manor, N. Y.*

●

INSURANCE MAN SPEAKS

● *Dear Mr. Fischer:* In connection with the inquiries regarding "Stock vs. Mutual Insurance for Fleets," the reason why so many fleet operators seem to prefer stock companies is this: The dividends offered by mutual companies are frequently referred to as "savings" and the insurance buyer is told that he is saving "so much" on the cost of his insurance.

We, as a stock company, do not consider this a proper designation of the mutual dividend payment, preferring to consider it as compensation given the policyholder for the risk which he assumes in going into the insurance business as a policyholder in a mutual company.

Naturally, the policyholder does not know what these risks are, nor does he know what the proper compensation should be for them; and no one really knows, except the underwriters and executives of the mutual company.—*Stock Company Executive.*

(EDITOR'S NOTE: This seems to be the correct time for a "Mutual" executive to tell us *his* side of the story. We hereby offer to print it, providing it is not too lengthy.—H. C. F.)

●

NOTE OF APPRECIATION

● *To the Editor:* Ours is a very small fleet, composed mostly of "ancient" vehicles. I am the mechanic who services them and have been on this job for the past 15 years. Unfortunately, "stupidity" seems to be what is expected of me.

I have been knocked down many times for suggesting improvements in operation and maintenance. I hope this is confidential. The result is that I, too, have been going backwards in recent years—the best years of development in the industry.

However, I have been reading FLEET OWNER for some time, and this publication has pepped me up again, from time to time, to tackle our chief, who is a very capable man himself, but who overlooks my end of the job until I am in trouble.

I hope you understand, and thanks again, for your excellent publication FLEET OWNER.—*Anonymous.*

●

HAS NEW VALVE-SEAT

● *To the Editor:* I noticed that you conducted a survey on valve-seat inserts some time ago, and that fifty operators reported that inserted seats have come loose in service, and on one make of engine in particular.

The writer has developed a patented valve-seat insert which will eliminate this trouble and I would like to hear from some of the operators who are having such trouble and also as to what make of engine seems to be giving the most difficulty.

Also, what is the correct procedure to have my valve-seat insert tested by the U. S. Bureau of Standards?—*G. E. Meeker, Garage Foreman, C. A. Durr Packing Co., Utica, N. Y.*

●

GENERATOR WANTED!

● *Dear Mr. Fischer:* I understand that one can get a small generator to fit on a Ford or Chevrolet ½-ton truck to generate 110-volts, AC current. . . . I wish to run a small oil pump by motor.

I believe that some company in the middle west makes this, and would like to have them send me circulars and prices.—*John W. Leahy, 150 White St., Danbury, Conn.*

●

DIRECTIONAL DATA

● *Dear Mr. Fischer:* We are considering the possibility of installing some type of directional-signal on some or all of our fleet of 69 trucks. As this will involve considerable investment, we are naturally anxious to get the best price for a signal that will actually do the job for which it is intended.

We would appreciate it if you would direct this inquiry to those firms maufacturing such a device, asking them to submit prices to us direct, or through their local agent. Where they are not represented in this city we would then want a sample submitted with the price quotation.—*New Orleans, La.*

●

WHAT COLORS FOR TRUCKERS?

● *To the Editor:* We have read in a recent issue an article entitled "Color Combinations for Trucks."

We are in the common carrier freight business. At the present time all of our tractors and the running gear of the trailers are finished in red, while the complete body of each trailer is finished in aluminum. We find that this color scheme is quite a common one, used by many truck lines, and naturally, it does not give us any distinctive color combination.

I note in the above-mentioned article that you offer to give an advisory service on color-schemes gratis. We do not expect this service gratis, but we would like to get into touch with some authority on laying out a color scheme for our tractors and trailers that would be a little bit different from the "run-of-the-mill" kind, and at the same time be serviceable.

Will you please refer this to the writer of the article and have him get into touch directly with us, and submit such a proposition as he may want to, and also to bill us within reason for the cost of such services.—*Long Distance Hauler, St. Louis, Mo.*

THE reliability of your schedules, the safety of your bus equipment, and—more important still—the lives of your passengers may often depend upon the unfailing performance of your lighting equipment. Take no chances when such vital factors are at stake. Always replace broken or damaged lamps or lenses with genuine Guide replacement parts . . . the same in design, in quality of materials and in precision of manufacture as the original Guide lamps and lenses which are used as standard equipment on so many buses, trucks and passenger cars.

You need this Guide Lamp Catalog which completely describes all Guide equipment for bus, truck and coach use. Also includes an up-to-date compilation of all state laws regarding the use of marker lamps and "Stimsonite" reflex units. Write for a free copy.

Guide

LAMP CORPORATION
ANDERSON, IND.

UNITED SERVICE MOTORS
Guide Lamps

Ford Trucks and Commercials for 1936

WHILE the 1936 Ford Trucks and Ford commercial cars feature a number of improvements, there are no major changes in design.

The radiator and grille have been redesigned and present a more massive appearance. There is a new radiator ornament. The louvres on the sides of the hoods are indented and extend inward in place of outward. This arrangement aids in expelling the heated air more quickly from under the hood.

There are other improvements which also result in more effective cooling. There is a new larger fan which has 4 blades and is 19 inches in diameter. The radiator core has been tilted so that it is now parallel to the plane in which the fan rotates, with the space between the fan and the core the same both top and bottom. This arrangement draws the air more uniformly through the core. The flexible spring mounting of the core, which relieves it of any strain due to frame distortion, has been retained.

A newly designed radiator shell prevents air from passing between it and the sides of the core. Thus the entire flow of air must now pass through the radiator fins and around the water tubes. Because of the increased size of the new fan, it was possible to reduce its speed from 1.28 times engine speed to engine speed and still increase the quantity of air displaced. Since the larger diameter generator pulley, to which the fan is bolted, runs at reduced speed and has greater belt contacting area, fan belt life will be increased.

The 1936 Ford trucks are equipped with new heavy duty universal joints of the needle roller bearing type, each joint being provided with 4 of these bearings.

Two changes have been made in the full-floating rear axle—the diameter of the axle shaft has been increased to 1-9 16 inches, and hardened steel hub stud adapters are now used on all axle flange studs to prevent the flange from developing any play on the studs which would result in backlash between the hub and flange.

Improved steering geometry has been gained by changes in the caster and camber of the front axle. This results in a reduction of tire scuffing, more even tread wear across the face of the tire, and an increase in steering stability which gives the driver easier control of a heavily loaded truck.

In addition to the large diameter service brakes operated by the brake pedal, the Ford truck braking system includes two fully-energized internal band brakes in the rear drums which are independently operated by the hand-brake lever.

There have been no changes in the 80 horsepower Ford V-8 truck engine. New production machinery and inspection equipment have resulted in still greater precision, smoother finishes for friction surfaces, and increased accuracy, the makers state.

No changes have been found necessary in the new heavy-duty clutch which was adopted last year. The principal feature of this clutch design is that centrifugal force acts on weighted lever arms to increase the clamping power of the pressure plate against the clutch disc as engine speed increases. This results in greater power transmitting capacity, with a reduction in the amount of clutch pedal pressure required at low engine speed. The truck transmission remains unchanged.

The truck chassis, with its radius rod and torque tube design, underwent major design changes last year. The transverse front spring was moved 4 inches ahead of the front axle, which made it possible to move the engine 8-11/16 inches forward. This resulted in increasing the distance from the back of the cab to the center of the rear axle 6½ inches and provided more ideal load distribution. These changes all have been retained.

The Ford truck braking system, which was changed last year when such items as self-centering brake shoes, floating wedges and ribbed, cast alloy iron brake drums were adopted, remains virtually the same. The front brake drums are now made the same as the rear drums, with the cast iron ring part of the drum cast integral with a steel drum disc.

A water temperature gauge and oil pressure gauge are in the instrument panel, as standard equipment, on all 1936 Ford trucks.

The Ford commercial cars for 1936 feature such improvements as easier steering, easier gear shifting, changes in the transmission and new pressed steel, electrically welded, one-piece wheels of improved appearance.

All of the commercial cars use the Ford V-8 truck engine and the truck cooling system with the exception of the sedan delivery and the station wagon. These use the Ford V-8 passenger car engine and the improved passenger car cooling system.

A number of changes have been incorporated in the steering mechanism of the commercial car to make steering easier. Steering gear reduction has been changed from 15 to 1 to 17 to 1. To further

(*Please turn to page* 62)

ANNOUNCEMENT

SCIENTIFICALLY DEVELOPED : : : : COMMERCIALLY PROVEN

NOW

FOR LARGE TRUCKS & BUSES

(not over 24 qt. crankcase oil capacity)

MODEL F-2

FRAM

OIL & MOTOR CLEANER

FRAM MODEL F-2

The new large F-2 FRAM Oil and Motor Cleaner, like the F-1, is sturdily built of heavy pressed steel. The body is made of one piece seamless material, insuring against weak spots or leaks. The heavy one piece cover is bolted to the body by 10 specially designed bolts thus insuring against leakage between the cover and body. Two heavy steel bands are provided so that it may be rigidly mounted on the motor or dash.

Each cleaner comes equipped with six inches of flexible tubing for inlet and outlet. This insures against copper tube failure from excessive vibration.

The same marvelous oil filter that has made the smaller FRAM (Model F-1) the outstanding success of the year, Model F-2 has been developed for trucks and buses of over 1½ tons capacity.

Over 500 truck fleets have adopted Model F-1 as equipment, because it not only pays for itself many times over the first year, but because it *saves the motor.*

Model F-2 can be purchased on the famous FRAM "Pay-As-You-Save" contract.

Write for details

FLEMING MANUFACTURING CO., Inc.
135 STAFFORD ST. WORCESTER, MASS.

MAIL THIS COUPON FOR DETAILS OF PLAN

FLEMING MFG. CO., Inc.
135 Stafford St., Worcester, Mass.

Please send us details of your FRAM Oil & Motor Cleaner and of your Pay-As-You-Save plan.

Name .....

Firm .....

Address .....

City .....State .....

No. of Trucks.....Crankcase Capacity....qts.

THE DIP STICK TELLS THE STORY — *Look at it!*

DON'T BE HIGH-PRESSURED!

CERTAIN publishers urge you to clip coupons, the object being "inquiries" for advertisers. . . . In this respect FLEET OWNER is "different." We have carefully selected the following new literature, believing that it will be valuable to fleet operators. . . . The firms who issue it have assured us that it will be MAILED to you, without cost, obligation or salesmen!

ANY OF THIS LITERATURE THAT YOU MAY REQUEST OBLIGATES YOU IN NO WAY. IT'S YOURS FOR THE ASKING. THE COUPON IS FOR YOUR CONVENIENCE!

250. "I DRIVE SAFELY" is the title of a new and instructive booklet recently gotten out by one of the leading truck manufacturers. It is intended primarily for distribution to truck and bus drivers. . . . Written in concise, understandable fashion, and *illustrated*, this booklet should be quite helpful to fleet operators in connection with their safe driving programs. . . . Indicate how many free copies you would like to have, when placing Number 250 on the coupon below. They'll be sent to you promptly and free.

•

251. COOLING SYSTEM ADVICE. How'd you like to have a set of the latest literature on cooling system cleaning, servicing and corrosion-control? With anti-freeze time just around the corner, does this not seem the time to look after radiators, pumps, hose and other cooling system components? . . . . Three pieces of helpful literature are offered by one manufacturer—a Cooling System Trouble Chart—a book on Corrosion Control—and a standard Cooling System Service Manual. . . . Another booklet outlines a safe and effective method for cleaning cooling systems of *all kinds*, including those with aluminum heads. . . . All of this helpful literature will be sent without obligation if you want it. Just mark Number 251 on our coupon. We will do the rest.

252. DOPE ON OIL FILTERS. There has been a complete evolution in the design of oil filters within recent years and there are many new types on the market. . . . Recently we conducted a "survey" on the subject and disclosed some very interesting information which indicated that the day is past when any "tin can full of cotton waste" will be accepted by the critical fleet man and expected to do a good filtering job. . . . Modern filters are constructed differently, and if you'd like to get the details of the Fram and Filterite filters, which operate on an entirely different principle, just mark Number 252 on our coupon, and complete details will be sent to you.

•

253. MORE WORK OUT OF YOUR TRUCKS? Here's a *very* interesting booklet, handsomely illustrated, that makes an *honest* effort to show you ten ways (no more, no less) of getting more work out of your trucks. . . . If you are wondering what your trucks are actually doing when they are out of your sight, and are searching for a better way to check costly delays, reduce loading time, prevent speeding and accidents, check up on overtime and a host of other driver-abuses, it will pay you to send for this booklet which shows how Servis Recorders work, how they provide the "ten ways" and how simple the system is. . . . Number 253 brings you a free copy of the *new* edition.

254. HOW TO USE PORTO POWER. When we introduced Blackhawk's "Porto Power" in an editorial description, many fleet operators failed to take notice of it, believing it to be a tool only to be used for body work. . . . Since this is *not* the case, and in order to set you right, they went to great detail in preparing a 24-page, illustrated book that truly shows "How to Use Porto Power," which is a hydraulic jack-and-ram combination that can be used for *anything*, from installing front springs on Fords to pulling out cylinder sleeves. . . . However, it will *not* mind the baby, answer your telephone, or throw out a too-insistent salesman. . . . This book has a price of $1.00 marked on it. It's really worth more, but a copy can be obtained *free* by marking Number 254 on the coupon.

•

255. HEAVY-DUTY BATTERY MANUAL. Although this particular book does *not* bear that title, that's what *we* would call it. Some of the things it gives are: An Interchangeability Table showing comparative makes of truck and bus batteries by number—A table of Lamp Data showing the proper candle-power lamps to use for various applications and giving the current-draw of each in amperes—How to Figure Ignition Requirements—How to Compile Maximum Ampere Hours per day for any given unit—Bus Requirements—How to Determine Starting Loads—and a table of Replacement Data for all makes of trucks and buses. . . . This book is offered, free, by Goodrich, who makes batteries as well as tires. . . . If you think it would be valuable to you, a free copy will be *mailed* by mentioning Number 255 on the coupon.

•

256. THE SNOW-REMOVAL PROBLEM. Many operators do not have to worry about a snow-removal problem. . . . Those who do, however, will certainly find this illustrated book of interest, especially county and state highway departments, municipalities, contractors and public utilities, including bus operators. . . . The FWD Company has spent quite a bit of money in making this publication possible, and if you'd like to have a copy before "the cold winds blow, and we shall have snow," just include Number 256 on our Coupon below. . . . It's free for the asking. P.S. A copy of "Good Roads" snow-plow book, will also be sent you.

•

257. POWER BRAKES ARE HERE. Don't be fooled! The day is not far off when *every* truck will be equipped with power brakes, mandatory or voluntarily. . . . Out on the Pacific Coast they have been working on power brakes for a long time. One of the pioneers out there (Besler, if you must know) has recently issued a complete power brake manual, showing how you can install power brakes on *any* vehicle, with a minimum of expense, fittings and alterations. . . . This new catalog will prove interesting, even if you aren't thinking about doing it today. . . . Number 257 brings a copy promptly.

The Editor, FLEET OWNER, 1935
90 West St., New York, N. Y.

Kindly send me without cost or obligation the following literature mentioned in the November issue. (Order by number)

.....

.....

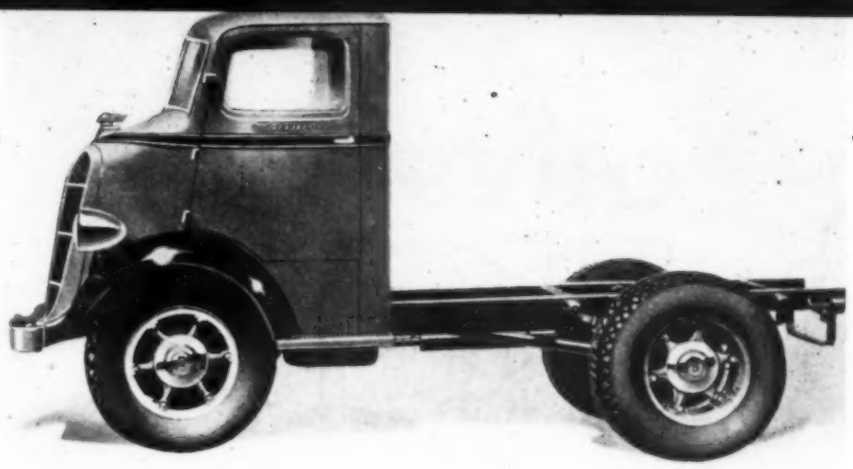
Name of Fleet .....

Address .....

City and State .....

Your Name ..... Position .....

Number of Vehicles Operated .....



Studebaker's "Cab Forward" Metro Models

LAST month the Studebaker Truck organization placed on the market their new "cab forward" truck design in the 1½ and 2-ton truck field. W. H. Edwards, general manager of Studebaker's truck division, gives us the following description of the new models.

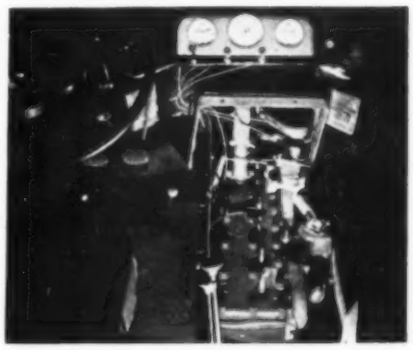
"The new 'cab forward' designs will be known as 'Metro' Models. Cabs and chasses complete are designed and built by Studebaker. The advantages of this design are apparent. It provides more payload space with shorter wheelbase; easier handling, backing, parking, turning and loading; better visibility; safer operation in crowded quarters; shorter overall length for trailer use; and it is easier for the driver to get in or out, from either side. All of these important advantages are now brought to the low-price field by Studebaker.

"Operators will appreciate that this cab-forward design will be only slightly higher in price than the conventional 1½ and 2-ton trucks. Studebaker offers an inexpensive design and has combined comfort and pleasing design without sacrificing sturdy construction," Mr. Edwards states.

"The new Metro Model trucks are modern and practical. For instance, it is possible for the driver to enter the cab through one door, walk through the cab, and exit through the other side with ease. The illustration clearly brings out the point that there is little or no obstruction in this cab. Ample leg room is provided.

"The cab doors are hinged at the front to provide better visibility for the reverse movement of the truck. V-type windshield and large windows permit good visibility, and large cowl ventilators provide ample air circulation.

Interior of cab of new Studebaker "Metro" Models. Note that there are practically no obstructions in the cab and that one can walk through it from either side with apparent ease. Note the gear-shift lever between the separate seats and the easily removable engine hatch.



Engine view from inside of cab with engine hatch removed, showing accessibility of carburetor, fan, distributor, water-pump, wiring and spark plugs. Sound and heat-proof insulation is used throughout.

"Cooling provisions for this type truck are actually better than for the conventional type," Mr. Edwards claims. "The engine hood is lined with insulating material, one inch in thickness to prevent the transfer of heat from the engine into the cab.

"The problem of servicing and adjustment has also been given careful consideration and we are of the opinion that 90 per cent of the service adjustments can be made easier and quicker in this type truck than in the conventional design," according to Mr. Edwards. "Quicker accessibility to carburetor, fan, distributor, water pump, wiring and spark plugs is apparent, when you examine the engine view.

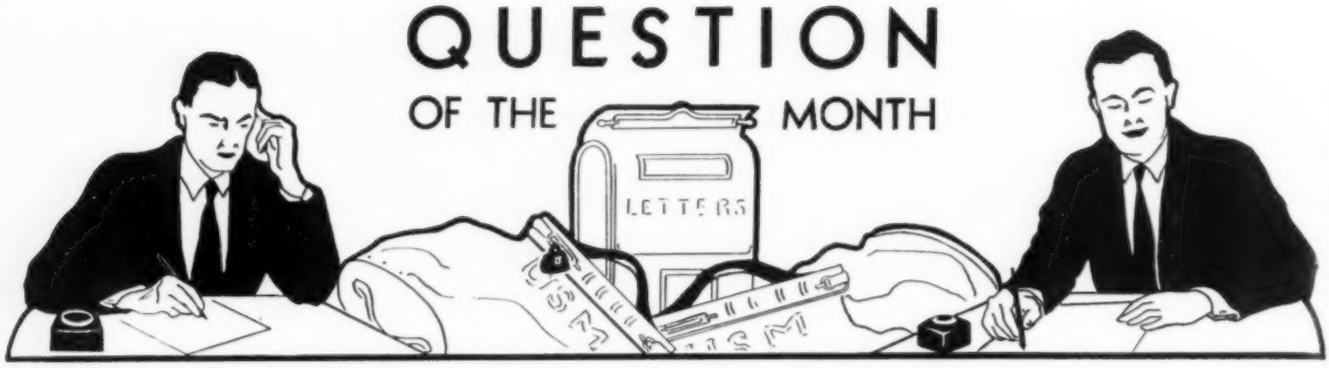
"Servicing and adjustment of valve tappets from the side can be accomplished easily and quickly. Furthermore, there is ample space between the engine and the front wheels to provide a comfortable working condition. Removal of the entire engine is possible from the front end." The foregoing paragraphs are the manufacturer's description.

The 1½-ton unit of this design will be called the Metro Ace and the same design in the 2 to 3-ton unit will be called the Metro Boss. The Metro Ace will be powered by a 217 cu. in. Studebaker truck motor developing 160 pounds-foot torque and 75 horsepower at 3200 r.p.m. This is not a passenger car motor but is designed exclusively for truck service, factory officials point out. A new and improved type water pump will be used, which does away with the necessity of repacking the pump.

A special wide Clark front axle will be used and will provide unusually short turning radius. A full-floating Clark rear axle will

(*Please turn to page* 62)

QUESTION OF THE MONTH



A FEW REPLIES TO THE ALIGNMENT QUESTIONNAIRE (No. 60):

Planning for Better Check-Ups

By E. P. Morgan, Garage Foreman,
Adley Express Company, Inc.
New Haven, Conn.

WHEEL alignment and headlight testing are two maintenance jobs that we have not perfected in our shop as yet. However, we are checking up on various available equipment for both of them.

At present all we have is a wheel aligning gauge and what little work is done along these lines is done in our own shop. We have not as yet done any serious headlight testing. . . . Our fleet consists of 62 trucks, 15 tractors, 24 trailers, 7 passenger cars and 4 miscellaneous vehicles.

•

Checks Toe-In at Greasing

By O. Swanson, Foreman,
Des Moines Electric Light Co.,
Des Moines, Iowa.

WE check all of our vehicles for toe-in only, every 1,000 miles, or every time the chassis is greased. If anything unusual is noticed, we send the unit out to a wheel alignment specialist. Sometimes this check-up is made with the vehicles loaded; sometimes unloaded. We have a wheel aligning gauge and an axle gauge.

Headlights are tested every six months on a headlight tester of the manufactured type. . . . We operate a fleet of 19 trucks and tractors; 5 trailers and 19 passenger cars.

•

Check Very Often in Taxi Fleet

By J. F. Rawlings, Supt. Maint.,
The Yellow Cab Company,
Baltimore, Md.

WHEEL alignment is included in our maintenance routine. We check each vehicle about every 3,500 miles. This work is done in our own shop, using a wheel aligning gauge; a caster or axle gauge; and a spindle gauge.

As a majority of the vehicles in our fleet are "knee action" equipped, it is found necessary to check front ends often, as wear on the threaded bushings constantly changes the caster, camber and steering geometry.

We test all our headlights on a monthly basis. In doing this, the lamps are focused on a wall chart furnished by the state motor vehicle commissioner. . . . We operate a fleet of 235 taxicabs.

•

Toe-In is Only Item Checked

By J. V. Goodbrake, Supt. Trans.,
Rairdon Transfer & Whse. Company,
Kansas City, Mo.

OUR vehicles operate only at slow speeds and in the city. Therefore the only item which we check in our shop is toe-in. We have never suffered any particular trouble in this respect.

Wheel alignment is checked in our own shop at the time of rebushing or repairing. When front axles become damaged, such as might occur in an accident, we remove the axle and send it out to be straightened, either hot or cold. In other cases these can be straightened without removing them from the vehicles.

We use only straight trucks and are not bothered with dual tire troubles. We do not test headlights. . . . Our fleet consists of 35 trucks and 7 passenger cars.

•

"Check Over a Long Period"

By H. R. Grigsby, Supt. Trans.,
Oklahoma Gas & Electric Company,
Oklahoma City, Okla.

EVERY 5,000 miles we check each unit for wheel alignment, using mixed brands of equipment for this work. These check-ups are made with the trucks loaded; the passenger cars unloaded; and it is done right in our own shop.

Our shop equipment for this work includes a wheel-aligning gauge; a caster or axle gauge; a spindle gauge; a tracking gauge; and a turning radius gauge.

We have checked front-end alignment over a longer period of time than the average fleet, and have developed some special gauges of our own for this work—some of which are now being copied by other fleets and even some manufacturers.

Headlight testing is also done in our own shop on a 5,000-mile basis. We use shop-built equipment—nothing outstanding. . . . Our fleet consists of 72 trucks and tractors, 44 trailers, 298 passenger cars and 6 miscellaneous vehicles.

•

Outside Shops Not Satisfactory?

By Dwight H. Woods,
Engineer-Distribution,
Nashville Gas & Heating Company,
Nashville, Tenn.

WE check for toe-in every 1,000 miles, with the vehicles unloaded. This work is not done in our own shop. Various makes of equipment are used. General wheel alignment check-up is not done until tires show signs of uneven tire wear. However, our tires are watched carefully.

In spite of trying a number of outside shops for wheel alignment work, we have not gotten very satisfactory work, particularly in trying to eliminate shimmy and tramp. Since any work done on wheel alignment never costs less than $7.50 per unit, and because of low tire prices, we do not feel that we can afford much front-end work.

Where duals are used we watch our tire changes and keep the worn tires on the inside.

Regarding headlights, our trucks are used but very little at night. However, we test the headlights of passenger cars at the driver's request. . . . We operate a fleet of 22 trucks and 9 passenger cars.

Question No. 62—Shop Equipment (Confidential)

Do you operate your own shop for servicing and/or repairing your vehicles? .....

What percentage of your total repair work is done in your own shop? .....

How many vehicles in your fleet? (Please fill in on next line)

Trucks ..... Tractors ..... Buses ..... Pass. Cars ..... Taxicabs ..... Trailers .....

What shop equipment are you now using? (Please check all items that you have, in list below)

- ☐ Acetylene Welding
- ☐ Air Compressor
- ☐ Arbor Press
- ☐ Axle Gauge
- ☐ Axle Stand

- ☐ Battery Charger
- ☐ Battery Repair Equip.
- ☐ Battery Tester
- ☐ Bearing Boring Jig
- ☐ Bearing Puller
- ☐ Bearing Reamer Outfit
- ☐ Body Repair Equipment
- ☐ Bolt Cutters
- ☐ Brake Drum Lathe
- ☐ Brake Lining Cutter
- ☐ Brake Lining Machine
- ☐ Brake Tester
- ☐ Bushing Puller

- ☐ Car Washing Machine
- ☐ Car Washing Gun
- ☐ Chain Hoist
- ☐ Cleaning Tank
- ☐ Coil Tester
- ☐ Compression Gauge
- ☐ Compression Tester
- ☐ Conn. Rod Aligner
- ☐ Crank Pin Truing Tool
- ☐ Creeper
- ☐ Cylinder Boring Bar
- ☐ Cylinder Hone
- ☐ Cylinder Gauge
- ☐ Cylinder Grinder (Large)

- ☐ Decelerometer
- ☐ Drill Press

- ☐ Electric Drill
- ☐ Electric Drill Stand
- ☐ Electric Sander
- ☐ Electric Test Bench
- ☐ Electric Welding Outfit
- ☐ Engine Dynamometer
- ☐ Engine Repair Stand
- ☐ Engine Test Stand
- ☐ Exhaust Gas Analyzer

- ☐ Feeler Gauges
- ☐ Fender Repair Tools
- ☐ Fender Rollers
- ☐ Flexible Shaft Outfit
- ☐ Floor Jack
- ☐ Floor Lamp
- ☐ Frame Straightener

- ☐ Gas Tank & Pumps
- ☐ Gasoline Torch
- ☐ Gear Case Flusher
- ☐ Gear Puller
- ☐ Glass Machinery
- ☐ Greasing Equipment
- ☐ Grease Rack
- ☐ Grinding Wheel

- ☐ Headlight Tester
- ☐ Hoist (Overhead)
- ☐ Hoist (Portable)
- ☐ Horses, Adjustable
- ☐ Hydraulic Jacks
- ☐ Hydrometer

- ☐ Lift (for Cars)
- ☐ Lathe
- ☐ Mechanical Jacks
- ☐ Micrometers
- ☐ Milling Machine
- ☐ Motor Analyzer

- ☐ Oil Reclaimer
- ☐ Oil Sprayer
- ☐ Oil Tanks & Pumps

- ☐ Painting Booth
- ☐ Paint Spray Guns
- ☐ Paint Striping Guns
- ☐ Pedal Depressor
- ☐ Piston Grinder
- ☐ Piston Pin Hone
- ☐ Pit
- ☐ Pneumatic Hammer
- ☐ Pneumatic Wrench
- ☐ Portable Crane
- ☐ Portable Light

- ☐ Radiator Flushing Machine
- ☐ Radiator Test Tank
- ☐ Reamer Set (Hand)
- ☐ Reamer Grinder
- ☐ Reamer-Drive (Power)
- ☐ Rear Axle Stand
- ☐ Rebabbitting Outfit
- ☐ Rim Tool

- ☐ Shaper
- ☐ Soft-Faced Hammer
- ☐ Soldering Iron
- ☐ Spark Plug Tester
- ☐ Steam Cleaning Equipment

- ☐ Tap & Die Set
- ☐ Tire Chain Repair Kit
- ☐ Tire Gauge
- ☐ Tire Inflator (Automatic)
- ☐ Tire Regroover
- ☐ Tire Retread Machine
- ☐ Tire Spreader
- ☐ Tire Vulcanizer
- ☐ Towing Truck
- ☐ Transmission Hoist
- ☐ Tranmission Stand
- ☐ Tube Vulcanizer

- ☐ Valve Grinder
- ☐ Valve Lifter
- ☐ Valve Refacer
- ☐ Valve-Seat Cutter
- ☐ Valve-Seat Grinder
- ☐ Valve-Seat Inserter
- ☐ Vises

- ☐ Wheel Aligning Equipment
- ☐ Wheel Balancing Machine
- ☐ Wheel Dolly
- ☐ Wheel Puller
- ☐ Wire Brushes (Power)
- ☐ Woodworking Machinery
- ☐ Work Benches

OTHERS:

.....

.....

.....

HOW much equipment is necessary for a fleet of a given size? . . . Your help in answering this questionnaire will enable us to give you the right answer. . . . Just make checks against the items you have. . . . That's all.—Editor.

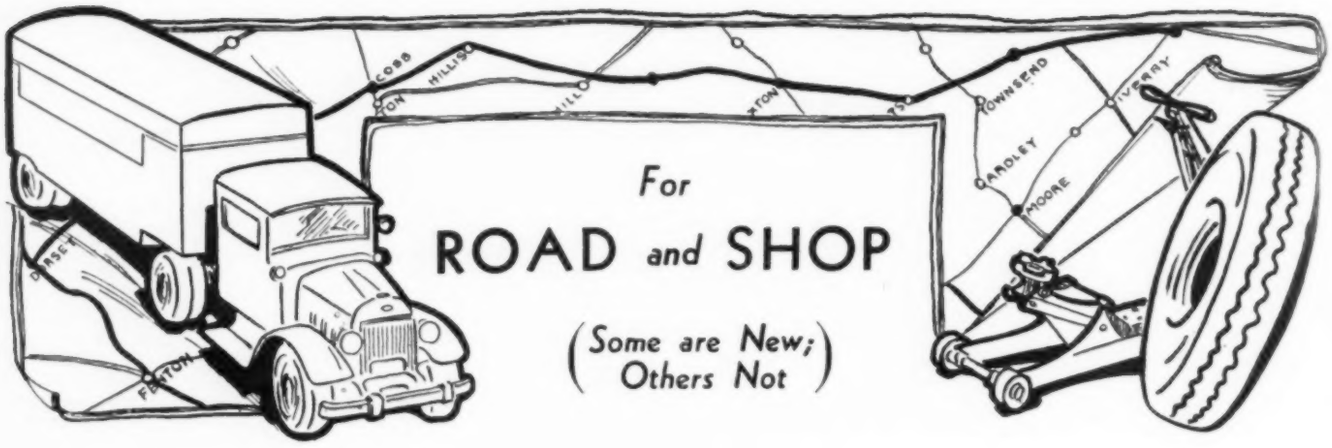
Name of Firm .....

Address .....

City or State .....

Your Name ..... *Position* .....

(Please send all replies to The Editor, FLEET OWNER, *90 West St., New York City)*



Perfect Seal Applicator Kit

THE increasing use by car manufacturers of high compression ratios and aluminum heads, or both, has created gasket problems which are today a real factor in the servicing of modern automobile engines. Water seepage, loss of compression and

blow-by are common troubles resulting from the "dry" installation of head gaskets.

"Perfect Seal," a castor oil base, non-hardening paste for use on all head gaskets is gaining rapid headway in this field, having been officially approved and adopted for production and service by several car manufacturers during the past few months, it is claimed by the makers.

To make the use of Perfect Seal on all head gaskets both easy and economical, a special "applicator kit," as pictured, is now furnished, through automotive jobbers.

Complete details may be had by addressing the manufacturer, P. O. B. Mfg. Co., Inc., Cincinnati, Ohio. . . . Mention of FLEET OWNER will help to secure prompt service.

•

"Five Star"—A New Anti-Freeze

THE Organic Chemicals Department of E. I. du Pont de Nemours & Company announces a new anti-freeze for automobile radiator protection called "Five Star Anti-Freeze," which, it is claimed, contains the qualities of protecting, against corrosion, all metallic parts of the cooling system. This has been developed following exhaustive laboratory and severe practical tests.

It contains five major ingredients that are considered necessary to provide complete protection. The name is derived from the five ingredients.

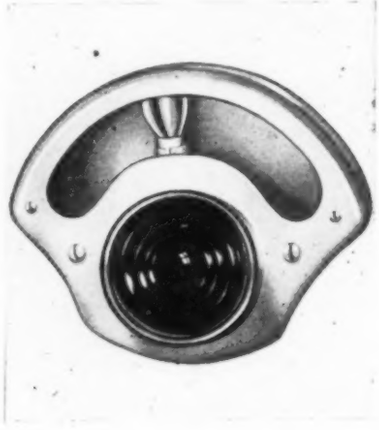
This anti-freeze, the makers state, not only prevents freezing and gives protection against corrosion, but it also protects against the hazards of rust-clogged radiators and potential engine injury due to over-heating, as well as providing maximum economy by materially reducing evaporation losses.

It is safe and harmless to motors, radiators, pumps and connections, the makers declare; and they will be glad to send further details on request. . . . Write to E. I. duPont de Nemours & Co., Wilmington, Del., if interested in more details.

•

This Stop-Light Wig-Wags

HERE is the newest thing in safety stop-lights. It is easily and quickly installed without any special tools or rearranging of wiring, we are told. It is electrically operated



and is fully automatic, using no more electric current than that of your present stop-and-tail lights.

The Dual Safety Stop-Lite, as it is called, "wig-wags" its warning signal back and forth, indicating to the traffic in the rear that the brakes are being applied and the vehicle is about to come to a stop.

Since a moving red light is more attention-commanding than a stationary one, it goes without saying that this device should make a very valuable safety device. It seems to answer the demand for more vigorous signalling.

The truck, bus and trailer model is illustrated here. Other models are available for passenger cars. . . . Price, literature and other details will be sent on request without obligation. Address Safety Signal Devices, Inc., 5031 Broadway, Chicago, Ill. . . . And if you mention FLEET OWNER when writing, it will be appreciated.

"Preparakote"—A New Primer

THE Finishes Division of the du Pont Company has developed a new primer for automotive refinishing, to be known as "Preparakote."

This, it is stated, not only forms an adhesive bond between the surface and the succeeding coat, but also serves as a filler.

The division claims that it can be dry-sanded in four hours after application, with a saving of from one to two days' time in refinishing some classes of automobiles.

If you'd like more details, and perhaps a sample, address E. I. du Pont de Nemours & Co., Wilmington, Del. . . . And if you mention FLEET OWNER it will help get prompt service.

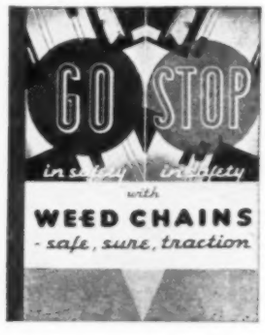
•

New Weed Chain Catalog

THIS year the complete catalog on Weed American Bar-Reinforced and Weed Tire Chains and Weed Automobile Accessories has been issued in a new size—10⅝" x 8½".

In addition to complete information on the various types of Weed American Bar-Reinforced and Weed Tire Chains for passenger cars, trucks, buses and tractors it gives data on Weed Emergency Units for passenger cars, tire chain repair parts, repair tools, adjusters, tow-chains, sling chains and Campbell Hammerlock Cotter Pins. Another new feature this year is a listing of tire sizes and cars that use them.

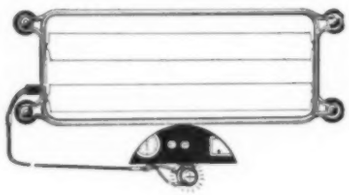
Any fleet owner who would like to



have a copy of the Weed Chain Catalog can obtain one by writing to American Chain Company, Inc., Sales Promotion Department, Bridgeport, Conn. If you mention FLEET OWNER, we'll appreciate it.

New Line of Casco Defrosters

THE new line of Casco Defrosters and Ice-Sleet Removers, for the coming season, includes several different models to suit all purses and purposes.



Casco Defrosters have been proven after years of experience to be scientifically correct for ice-sleet removal and for defrosting. They are dependable in the severest weather, the makers state, and are not harmful when used on safety or shatter-proof glass.

The Casco No. 51 Deluxe Defroster is shown here, which carries a list price of $6.00, including illuminated switch. Several other models are available, at prices ranging from 80c to $5.00 each. There are also several models of electric windshield heaters at extremely low prices.

For interesting catalog sheet giving details and prices of the complete line, address Casco Products Corporation, Bridgeport, Conn. . . . Mention of FLEET OWNER will secure prompt attention.

•

DeVilbiss Issues New Catalog

THE DeVilbiss Co. announces a new catalog, the "SF," covering the DeVilbiss line of specialty equipment.

This includes portable air compressing units; spray guns and accessories for the light duty application of paints, lacquers, and other protective coatings, insecticides, motor car lubricating and washing; air brushes; and many other items in the extensive line of DeVilbiss specialty equipment.

Those who have been using the Catalog "SE" should not fail to replace it with one of the new catalogs, as several changes of major importance have been made and listed accordingly.

Copies of the new Catalog "SF" may be secured from The DeVilviss Company, Toledo, Ohio. . . . Mention of FLEET OWNER will help to secure your free copy promptly.

•

New Battery Data Book is Free

A NEW 16-page supplement to its salesmen's catalogs on "Batteries for Trucks and Buses, 1935-1936" has recently been published by The B. F. Goodrich Company, Akron, Ohio, and is now available to fleet operators of trucks and buses upon request to the manufacturer.

First pages are devoted to a discussion of operating requirements of truck and bus batteries and a description of Goodrich construction features. A page is given to truck and bus battery specifications, and three pages to an exposition of the battery power requirements for trucks and buses, including a lamp data table. Five pages are devoted to replacement data on truck and bus batteries.

For your free copy, address B. F. Goodrich Company, Akron, Ohio. . . . Mention of FLEET OWNER will speed up the service.

•

Provides Constant Oil-Level in Crankcase

ILLUSTRATED here is a new device called the "Automatic Constant-Level Crankcase Oiler." It is designed for mounting directly above the motor, and is said to keep the crankcase of any engine, full of oil, to the *correct* level, at all times.

The device is automatic and requires no attention on the part of the driver, assuming that sufficient oil to replenish that used by the motor is kept in the oiler at all times.

It comes in one-gallon and three-gallon sizes, and operates by a combination of gravity and vacuum, *without* utilizing intake-manifold vacuum. In fact, this device seems so simple that we wonder why it was not thought of before.

If you'd like to see your vehicles leave the garage in the morning, and be assured that no oil will have to be added on the road—and no inspection of the oil-level will be necessary either, write for further information. Address Motor Service & Mfg. Co., 3301 Indiana Ave., Chicago, Ill. . . . Mention of FLEET OWNER will help.

•

New Booklet on Floor Maintenance

THE efficient and economical maintenance of plants and business properties is assuming greater importance every day, because this is one phase of plant management that directly affects production, intra-transportation of materials, conservation of plant equipment and protection of merchandise.

The Stonhard Company, 401 North Broad Street, Philadelphia, Pa., specialists in the field of industrial maintenance and construction materials, has just issued a guide to successful methods of keeping floors, roofs, walls and foundations in good repair.

It is an attractive 24-page booklet, profusely illustrated, designed so that maintenance men, purchasing agents and plant superintendents can gather a wealth of "meaty" information from its pages.

Among the most important subjects are: Lengthening the life of concrete and wood floors; leveling rough spots and worn places in all types of floors and trucking aisles; roof waterproofing methods; waterproofing masonry against hydrostatic pressure.

The booklet is entitled "OVER THE ROUGH SPOTS" and a copy may be obtained upon request to the Stonhard Company at Philadelphia, Pa. . . . Mention of FLEET OWNER will be appreciated.

•

Kingston Tapering Battery Charger

MANY operators will probably be interested in the Kingston Battery Charger illustrated here. It is made by the Kingston Products Corporation, Kokomo, Ind., and recommended by that veteran manufacturing organization as a means of eliminating the many troubles that result from "run-down" batteries.

The Kingston is a very moderately priced product, and is contained in a small, compact metal case, which may be mounted on the wall of the garage quickly and easily. Wiring connection is provided for plugging into any AC outlet. Current consumption is said to be very low.

Operation of the charger is extremely simple. Vehicles for which it is to be used to charge batteries are each equipped with a small plug which is attached to the dash by means of a wing nut. This plug, in turn, is connected permanently to the ammeter and ground, so that merely plugging in the line from the charger places the battery "on the line."

Because of this arrangement, charging the battery does not interfere in any way with service work and, of course, it is not necessary to remove the battery, or even to lift

the hood. The charger is easily portable, it being necessary merely to pull out the AC plug and lift the charger off the screw or nail on which it hangs.

The device delivers six-volt DC current tapering from four to two amperes. It is fully guaranteed by the Kingston Corporation, Kokomo, Ind., who will be glad to send full details if you mention this announcement.

Schrader Truck Repair Valves

THESE valves are especially designed for repairing all-metal truck and bus valves, where the base is cured into the tube. When the original valve has become damaged or

broken, the holding tool, also illustrated here, is to be screwed on to the valve body threads, down to the tube surface.

The old valve is then hack-sawed along the top surface of the tool. Removal of the tool leaves a threaded stud sufficiently high for applying the repair valve.

The makers claim that this process makes a sturdy, air-tight seal, just like the original valve. For further details, address A. Schrader's Son, Inc., 470 Vanderbilt Ave., Brooklyn, N. Y. . . . Mention of FLEET OWNER helps.

•

New Small Acetylene Generator

A NEW small-size medium-pressure acetylene generator for portable or stationary service has been announced by The Linde Air Products Company, 30 East 42nd Street, New York. Known as the Oxweld Type MP-6 Medium Pressure Generator, this latest addition to the Oxweld line of generating equipment has a 50-lb. carbide capacity with a double rating of 100 cu. ft. of acetylene per hour. Developed for portable or stationary use with any type of oxy-acetylene cutting or welding apparatus, it meets the demand for small, rugged, low-priced generating equipment of modern design.

A handwheel at the generator top makes it possible to control the carbide feed so that acetylene at any desired pressure up to 14 lb. per sq. in. may be obtained. The carbide feeding mechanism incorporates the same principle of gravity type, pressure diaphragm-control as the larger Oxweld Types MP-4 and MP-5.

Skillful design, and the extensive use of pressed steel parts and bronze-welded galvanized steel sheet result in a neat, sturdy, and extremely compact unit—a decided improvement over any generator of like size yet made.

There is practically no exposed piping, and such operating mechanisms as the feed control, carbide hopper, hydraulic back pressure valve, and filter are all assembled within the dome-shaped top of the generator. The dome may be tilted back if access to the interior is necessary.

Special automatic controls make the Oxweld Type MP-6 Generator particularly safe to operate. It has been tested and accepted by the Underwriters' Laboratories at the double rating for generating capacity. In addition, it has been listed for both stationary and portable service.

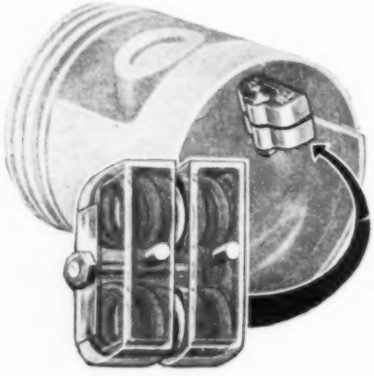
The generator can be mounted on a truck for transportation from job to job, or fitted for permanent installation to supply medium-pressure acetylene through pipe lines.

•

Pedrick Offers "Jet" Piston Re-Sizer

HERE is an *adjustable* piston resizer, offered by Wilkening Manufacturing Company makers of Pedrick piston rings, who state that it provides a controlled means of expanding collapsed piston skirts to the proper diameter, in order to give the exact correct clearance between piston and cylinder wall.

Installation is made by drilling two small holes in each piston, adja-



cent to that point of the slot that will give full length expansion. A fixture is provided for correct drilling of these holes.

After installation, the diameter of the piston skirt can be adjusted to a fraction of one-thousandth of an inch, the makers state, by turning the adjusting screw and setting the locknut.

One size fits all pistons, and six pistons can be "expanded" in about ten minutes, the makers declare. For complete details address Wilkening Manufacturing Company, Philadelphia, Pa. . . . And if you tell them you saw it in FLEET OWNER, they'll appreciate it—and so will we!

•

"Pontine"—A New Seat Fabric

AFTER three years of field testing, which was preceded by extensive laboratory tests, the Fabrikoid Division of E. I. du Pont de Nemours & Co. announces "Pontine," a new heavy-duty upholstering fabric for seat cushions and backs on trucks and buses where a tough, water-proof and sun-resisting material is required.

In these actual and severe tests, "Pontine" accomplished all that its makers had planned for it; namely, that abrasive wear on truck seats the first year gave no indication of failure of the material, and that after three years these seats had held up better than anything previously used for upholstering them, according to du Pont officials.

"Pontine" is a rubber upholstery fabric, having an extremely tough surface and great tensile strength. It was designed to measure up to the requirements of commercial vehicles in withstanding hard and even abusive wear under any climatic condition. It is available in a number of different colors and qualities, the latter scientifically gauged to serve definite purposes.

For free samples address E. I. du Pont de Nemours & Co., Wilmington, Del. . . . Mention of FLEET OWNER will insure prompt service.

•

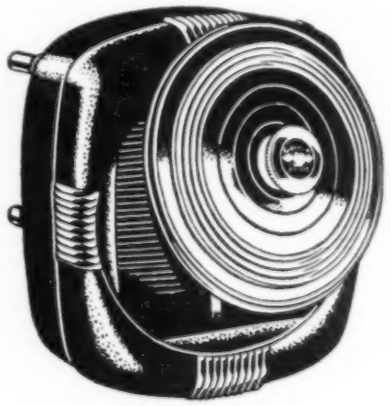
Goodrich Hot Water Heaters

A NEW type hot water automobile heater, with several new features is announced by The B. F. Goodrich Company. The company will market only two heaters, the new "Goodrich De Luxe" and the "Standard."

Chief among refinements in the "De Luxe" is the hot water trap, which turns the heater into a hot water boiler, working on the same principle as a home heating system. This water trap keeps the hot water from being sucked out by the pump, and the faster the car is driven, up to 55 miles an hour, the greater the actual heat produced. It also gives quicker heat at the start.

Other advantages of the new product are: Patented deflector throws heat in any direction by a touch of the finger; exclusive angle tube core, of all copper and brass construction, with warm air directed toward driver; deflector "floated" on rubber cushions, eliminating rattles and preventing leaks.

The heater motor requires no oil, operates quietly; heater may be mounted vertically or horizontally, providing maximum foot room, spe-

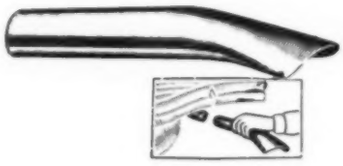


cial "rocker" washers permit mounting on a slanting dash; rounded streamlined design of heater and deflector gives added protection to shoes and stockings; special rheostat switch illuminated and calibrated to show whether heater is on "high," ¾, ½, ¼ or "low"; and is equipped with Goodrich braided hose. An attachment is also available for defrosting windshields.

For full particulars address B. F. Goodrich Company, Akron, Ohio. . . . You'll mention FLEET OWNER, won't you?

Chromium Exhaust Pipe Extension

HERE is the latest product of Bellevue Manufacturing Company, Bellevue, Ohio, manufacturers of a complete line of stampings, trunk racks, carriers, bumpers, bumper



guards, etc. . . . The new product, illustrated here, is a chromium plated exhaust pipe extension, which prevents exhaust gases from discoloring rear fenders and bumpers.

•

New Catalog on Valves and Parts

THE Toledo Steel Products Company, announces a new catalog covering their complete line of valves and valve parts.

The catalog contains all 1935 information and listings on valves, valve guides, springs, keys and valve inserts manufactured by this company for all types of automobiles, trucks, buses and tractors.

Copies of this useful catalog may be secured from The Toledo Steel Products Company, Toledo, Ohio. Mention of FLEET OWNER will help secure prompt service.

•

To Prevent Paint "Popping"

WITH the development of Lithoform by the American Chemical Paint Company, Ambler, Pa., the old problem of making paint stick to galvanized iron and galvanneal has been solved, it is claimed. When surfaces are treated with this new chemical they will "take" paint perfectly. The coating provided by Lithoform will not wash off, it will not chip, it will not corrode in the weather, and it is not affected by baking temperatures, the manufacturers state.

Manufacturers and users of truck, trailer, and bus equipment and bodies; as well as utility companies; and other users of galvanized iron and galvanneal will find Lithoform a simple and inexpensive means for obtaining lasting decorative finishes, it is pointed out.

Lithoform is applied by brushing it on, or by spraying. The surface is first cleaned and then lightly scoured with fine steel wool. Following the Lithorizing treatment, the surface is washed and dried and is ready for painting. Lithorized surfaces will not react with the atmosphere, so they do not have to be painted immediately, it is claimed.

Research found that the reason paint would not adhere to galvanized iron and galvanneal was because the zinc oxides and carbonates formed on the surface by reaction with the atmosphere, combined with the oil in paint to form an insoluble, inelastic zinc soap. It was this inelastic soap layer between the metal and the pigment that cracked and caused the paint to peel. Lithoform, by purely chemical action, forms an impervious stone-like coating on the metal. This coating prevents the formation of zinc soaps and in addition forms a better bond with the paint, the makers declare. . . . When writing for details, mention of FLEET OWNER will be appreciated.

•

New Bearing Parts Assortment

A NEW, special assortment of engine bearing parts for Ford, Chevrolet and Plymouth car and truck engines has been introduced by the Federal-Mogul Corporation, Detroit, Michigan.

The assortment is designed to save time, trouble and labor for the repair shop, all of the parts in the assortment—bearings, piston-pin bushings,

bolts, nuts and Laminated shims—being ready for instant use without further fitting, cutting or scraping, it is claimed.

The convenient, hinged-lid carton carrying the assortment illustrates each part and its purpose, and every item is clearly numbered to correspond with the individually packaged parts in the carton. One of the advantages of this assortment is that it is easily refillable from jobber stocks.

In addition to complete assortments for these three popular car and truck models, the carton includes, free, a copy of the copyrighted textbook "Automobile Engine Bearings and How to Service Them." For further details write Federal-Mogul Corp., Detroit, Mich. . . . Mention of FLEET OWNER will be appreciated.

•

New Stainless Steel Welding Rod

A NEW stainless steel welding rod for welding chrome-nickel steels of the 18-8 type has just been announced by The Linde Air Products Company, 30 East 42nd Street, New York. Known as Oxweld No 28 Columbium-Treated 18-8 Welding Rod (Patent Applied For), this is an important addition to the Oxweld line of welding rods. It simplifies the fabrication of products from 18-8 stainless steel and greatly improves the corrosion-resistance of the fabricated joint areas, it is claimed.

The outstanding feature of the new oxweld rod which makes it suitable for this work is the inclusion of a definite quantity of the element columbium. Because of this feature, products fabricated from "treated" or "stabilized" 18-8 steel by welding with Oxweld No. 28 Rod have full corrosion resistance and heat resistance in the as-welded condition. No heat-treatment after welding is necessary, the makers state.

Because of resulting economies and improved welds, the use of this rod greatly extends the possibilities for oxy-acetylene welding in the fabrication of 18-8 equipment to be used under corrosive or oxidizing conditions. This is particularly true with fabricated articles subjected to high temperatures. The use of Oxweld No. 28 Rod requires no special technique other than that usually employed in welding stainless steel, it is pointed out by Linde Air Products, 30 E. 42nd St., who will be glad to send further details on request.

•

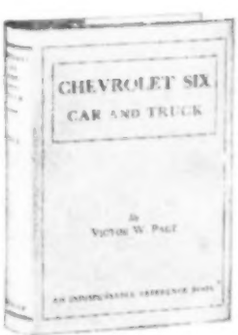
Book on Chevrolet Cars and Trucks

REVISED and enlarged to include the 1935 models, a new edition of *"The Chevrolet Six Car and Truck"* has recently been published. The author is Victor W. Page.

Fleet operators who have cars or trucks of this make in their fleets will find the book to have a great deal of authentic information on the construction, operation, maintenance and repair of all Chevrolet Six models, from 1931 to 1935 inclusive.

There are many short-cuts featured; also special tools and equipment to facilitate rapid and efficient maintenance. The latest knee-action front suspension is covered, and everything is outlined quite clearly.

Suggestions are given for up-keep, trouble-shooting on the road and in the shop, power-plant overhauling,



location of defects in carburetion, cooling systems, ignition, etc.; also complete lubrication instructions.

This book contains 665 pages and 228 illustrations. The price is $2.50. Published by Norman W. Henley Publishing Co., 2 W. 45th St., New York City. . . . Also available through FLEET OWNER, 90 West St., New York City.

WHAT FLEET OPERATORS ARE DOING

Free Rides for Customers in This Bus

WHAT is said to be the finest, most modern customer-transportation system in the world, has recently been inaugurated in downtown Cincinnati, by the Alms & Doepke Company, one of the largest department stores in the middle west.

The customer-service started when the company placed its new fleet of four 32-passenger White City Coaches into operation in the downtown district. The new coaches, purchased from the White Motor Company at Cleveland, O., are the ultimate word in beauty, safety, and comfort.

They are painted harmoniously with two shades of green, with the roofs colored green and gold. The City Coaches, known as White Models 684, have 12-cylinder "Pancake" engines and silent transmissions, and are characterized as the ideal 32-passenger coach. The performance and riding qualities justify this superlative description, the makers state.

The most unique feature of the White 684 is its 12-cylinder horizontally opposed engine. The symmetrical design of the "pancake" engine permits a balanced mounting with the transmission units entirely below the floor and between the wheels. This balance and location of weight lowers the center of gravity so that pitching is eliminated and sideway is reduced to a slow comfortable motion. In fact, the riding comfort is so near that of passenger cars that it is hard to tell the difference, according to White officials.

The chassis is constructed throughout of double heat-treated steel, and the body is built entirely of aluminum, aluminum alloys, and steel; no wood is used except in the floor and roof coverings. The coaches are kept cool and ventilated in the summer by a force-ventilating system which distributes fresh air evenly throughout the coach at the rate of 10 cubic feet per minute per seated passenger. A modern hot air heater keeps the coach warm and comfortable in the most severe winter climates.

This new fleet of ultra-modern White City Coaches replaces the buses formerly used by Alms and Doepke.

●

Opposition Grows to Gas Tax Increases

FOUR recent executive, judicial and legislative actions in widely separated parts of the country indicate a growing opposition to increased gasoline taxation. Two increases have been rejected; one increase that had passed has been declared unconstitutional; and two reductions in tax have occurred.

The Supreme Court of Nebraska has ruled the 1c per gallon increase in the state's gasoline tax unconstitutional. The increase was passed last March. The entire revenue from the increase, estimated at $3,000,000 annually, was to have been diverted to other than highway purposes.

The suit testing the validity of the increased levy was brought by Calvin J. Stover, a taxpayer, in behalf of himself and other taxpayers. The tax was temporary and would have automatically expired on June 30, 1936. Approximately $1,200,000 had been collected as a result of the increase during the six months it was in effect, but no decision has yet been made by state authorities as to the disposition of the money.

Governor Tom Berry of South Dakota has refused to call a special session of the legislature to consider an increase in the gasoline tax in his state, despite a petition presented by the advocates of hard roads requesting such a session. Governor Berry is reported to favor a hard-surfacing program, but does not believe consideration of an increased state tax at this time is advisable.

The City Council of Jacksonville, Florida, has also turned down a proposal to increase the levy on motorists. It has discarded a plan for a 1c per gallon city gasoline tax, on the grounds that gasoline dealers in the city would suffer and because it would create a difficult enforcement problem.

The county commissioners of Jackson and Harrison counties in Mississippi have taken the lead in tax reduction by eliminating their former county levies of 2c a gallon.

That public opinion is solidifying against gasoline tax increases is further indicated by the fact that numerous political candidates for election this fall have placed planks in their platforms opposing any increase, and many of them advocate reduction in the tax.

●

Another Six-Wheel Unit Conversion

HERE is one of the well-known four-wheel, chain-drive Macks. It was recently converted into an efficient six-wheeler, we are told, by the installation of a Utility six-wheel attachment. Body length and carrying-capacity were thus increased.

The trailer which it is hauling is also one of Utility manufacture. There are many of these old units being converted on the West Coast, and also in other parts of the country. Petroleum operators will undoubtedly be interested in this job.

If further details as to the unit are required, these can be obtained from Utility Trailer Company, Box 1407, Arcade Annex, Los Angeles, Calif. . . . Mention of FLEET OWNER will speed up the service.

THROUGHOUT THE UNITED STATES

Fleet of Ten Buses Makes Coast-to-Coast Run

WITH clock-like precision, the longest over-the-road shipment of buses ever attempted—a trans-continental run from the Allentown plant of the Mack company to the garages of the Pasadena-Ocean Park Stages in Pasadena, was recently carried through on schedule with not a single untoward incident to mar the trip.

This drive-away of ten rear-engined Mack CQ buses is also of unusual interest because it netted a saving of almost $2,500 to the purchaser, over the charges which would have resulted had the buses been shipped by rail.

The distance of 2,969 miles was covered in 93½ hours actual rolling time. This is the time the drivers were behind the wheel and the equipment actually moving, an average running speed of nearly 32 miles per hour. Total elapsed time was 9 days and 2 hours, the convoy averaging approximately 325 miles per day.

The bus caravan encountered all kinds of weather. Its route lay over mountains, through crowded city streets, and across the deserts of the Southwest. Yet, not once did any of the buses lose contact, nor was there even a fender bump to show when the trip was over. All of which may be credited to the careful and efficient manner in which the entire trip was planned and supervised by J. T. Asbury, head of the Asbury Transportation Co., which controls the Pasadena-Ocean Park Stages. Mr. Asbury accompanied the equipment from start to finish, riding in No. 1 bus, a position which enabled him to have complete control over the speed, and selection of routes through the different cities.

Each driver was required to stay 1000 feet behind the bus in front, until a town was reached, whereupon he rolled up to within 30 feet of the forward bus. Driver No. 1 was responsible for Driver No. 2, he in turn being responsible for maintaining contact with No. 3, and so on down the line. As can be seen, if No. 10, the driver of the tail-end bus had to stop for any reason he would automatically stop the No. 1 bus, since each driver was guided by the action of the bus behind him.

The procedure was to rise at 3 A.M. and start moving at about 4 A.M. Every two hours a stop was made for fifteen minutes. An hour and a half after luncheon a forty-five minute stop was made. Final stop for the day was always about an hour before sundown. Each night all the buses were lubricated and the oil changed. This was supervised by a Mack service man who slept on a cot in one of the buses during the day.

Preceding the buses at all times was a scout car employed to locate parking places, gas stations and hotels. As a result when the caravan arrived at the city limits of any town where a stop was to be made, there was no last-minute bustle and confusion, all necessary arrangements having already been made.

The log of the trip kept by Mr. Asbury reveals some interesting cost figures. An average of 493 gallons of gasoline was consumed by each bus, an average of 6 miles per gallon. The average cost of gas and oil per bus totalled $92.36. Wear on tires was estimated at $13.00 per bus. These charges combined with the drivers' expenses and salaries plus insurance and general expenses brought the total average cost for each bus to a little over $300.00.

●

Some Interesting Cost Figures

OFTEN we are asked for cost figures on various makes of trucks, large and small, low-priced and high-priced ones.

Here are some figures offered by Joe Heidelmeier, who operates a Ford V-8 pick-up truck in his business of well-drilling, at Washington, Pa.

Original cost $491.00, less tires	
Depreciation @ 100,000 miles	$.00491
Gas @ 18c per gallon @ 16 mpg.	.0088
Oil @ 35c per quart, 5 qts. each 2000 miles	.000875
License @ $26.00 per year @ 20,000 mpy.	.0013
Insurance @ $32.00 per year @ 20,000 mpy.	.0011
Grease @ $1.00 each 1,000 miles	.001
Tires @ 20,000 miles @ $64.00 per set	.0032
Repairs @ $.002 per mile, accumulative	.002
Total cost per mile	$.023185

Heidelmeier figures his operating expenses on his Ford V-8 pickup at 2.3185 cents per mile. His detailed reckoning is tabulated above.

●

Police Dept. Dramatizes "And Sudden Death . . ."

NEW YORK'S Police Department endorses the current theory that a realistic reminder of the stark horror of auto accidents is the most effective means of promoting highway safety.

The illustration shows two Mack trucks loaned by the United States Trucking Corp. to the Police Department to transport its gruesome exhibit to different parts of the city.

The automobile is one which figured in an actual wreck. Lying alongside is the wax figure of a woman with red paint splashed over the face to give the impression of a gory smear. On the other side the crumpled figure of a man hangs limply over the window, with a stream of red trickling down the side of the car. So realistic and horrible is the sight that it brings involuntary shudders to many of the passersby.

The grim display has been prepared by Patrolman Svec, shown standing beside the truck, who accompanies it on all its tours.

Fleet Man Develops "Auxiliary Carburetor"

YOUR Editor witnessed an interesting demonstration last month, when "Al." Loebs, fleet maintenance man for one of Brooklyn's largest chain grocery stores, put his "auxiliary carburetor" through a convincing test on the dynamometer of E. A. Wildermuth, Inc., Brooklyn, N. Y.

The "Loebs Auxiliary Carburetor," as it is called, is a small device that attaches to the intake manifold and is controlled entirely by vacuum. At the dynamometer test, at which were present a number of prominent fleet men, a Packard 8-cylinder car was used. Without Loeb's auxiliary carburetor, the combustion efficiency registered 60 on an exhaust gas analyzer. . . . With the auxiliary carburetor installed, the combustion efficiency jumped to 80.

Gasoline consumption on the car in question was decreased by 20 percent, and the speed of the car, originally set at 30 m.p.h. was increased to 34 m.p.h. when the auxiliary carburetor was used, without altering the throttle setting.

Briefly, the Loebs Auxiliary Carburetor consists of an automatic valve that is threaded into a 7/16-inch hole in the intake manifold. An adjusting screw is provided so that adjustment at idling can be made. Then the throttle is rapidly opened, until the engine will "take it" without popping back. That's all there is to it. One model will fit any engine.

This device, according to the makers, provides maximum economy at intermediate speeds. At idling, and at wide-open throttle, the device automatically becomes inoperative, thus providing sufficient fuel for open-throttle requirements. If you'd like further details, write directly to Moore-Chapin, Inc., 1061 Atlantic Ave., Brooklyn, N. Y. . . . Mention of FLEET OWNER will bring a prompt reply.

●

"They Laughed When I Sat Down at the Piano"

JOE HEIDELMEIR'S opponents laughed when he entered his truck in a stock car race at Washington, Pa., last Memorial Day, but Joe collected the cash prize, which further goes to prove the truth of the old adage, "He who laughs last, laughs best."

It was with his 1935 Ford V-8 pick-up truck that Heidelmeier won the race, which was run on the half-mile flat dirt track of Arden Downs. Entered against him were seven 1935 models of popular passenger cars and one manufactured last year.

"We were given a flying start," Heidelmeier reports. "I took the lead and maintained it until the finish. On the rough turns, the balance of the truck made steering easy. Though some of the passenger cars had windshields and tops removed for racing, my truck kept to standard equipment in every respect."

Heidelmeier uses his truck for emergency trips in his business as gas, oil, and water well-drilling contractor.

●

Trucks and Farming

THE importance of motor trucking as a factor in the farming industry is strongly indicated by statistics which the California Department of Public Works has assembled.

Approximately 12,000,000 tons, or two-thirds, of California's agricultural production during a single year moved by truck, according to "California Highways and Public Works," official state publication.

"Out of a total of 1,051,000 tons of agricultural and animal products delivered in the Los Angeles markets in 1933," the publication states, "83 per cent arrived by truck. And of 424,000 tons of similar shipments to the San Francisco market, approximately two-thirds were delivered by truck."

●

Builds DeLuxe Van Body of Aluminum

RATHER appropriately called "the van body of tomorrow" is this recently built unit, placed in service by T. G. Buckley Company of Boston, Mass. Although this job is modern in design, it is interesting to note that the body itself is almost an exact duplicate of a similar body built for the same firm, five years ago.

In adapting this body to the Model 30 Federal chassis, The Gerstenslager Company of Wooster, Ohio, who built it, found it necessary to first widen the hood and cowl in order to effect proper streamlining. Construction is of aluminum outside, with the inside finished in wood veneer.

Features to be noted are: sloping windshield with hinged side-wings; electric sign in fore-peak; courtesy, marker and distance lights—front, side and rear; directional signals, front and rear; reflectors, front and rear; double rear-view mirrors; full-length rear doors, with inside tail-gate; and other special equipment.

Contributing to the attractiveness of finish is the color-scheme and lettering. The background is dark green enamel, with aluminum roof and lettering in gold leaf with black and red shading. The forward part of each side carries an attractive panel which features the four different phases of Buckley's business—moving, packing, shipping and storing.

For further details concerning this and other types of deluxe van bodies, address The Gerstenslager Company, Wooster, Ohio. . . . Mention of FLEET OWNER will be appreciated.

JOHN LAW SEZ:

Recent Court Decisions and other Laws as Reported by American Trucking Associations, Inc. and The American Petroleum Institute

ALABAMA

Solid Tire Truck Rates Up

A BRAND-NEW law in Alabama, reducing the registration fees on passenger cars, and increasing the fees for solid-tired trucks and trailers went into effect last month.

Trucks and semi-trailers with solid tires must now pay two and one-half times the regular fee, instead of 50 per cent additional, as provided previously. In addition, the law eliminates the seven-ton classification of trucks.

The new statute also provides that licenses may be purchased for new automobiles on a declining basis of 1/12 of the annual tax fee per month. The minimum fee is $2. The old law provided for quarterly declines.

•

CONNECTICUT

New Minimum Dump Truck Rates

THE establishment of a new schedule of minimum dump truck rates has been made by the Connecticut Public Utilities Commission, as the result of a petition made by the Connecticut Dump Truck Owners Association; Paul J. Goldstein, Secretary.

The rates, established under authority of the recently enacted Connecticut regulatory law, apply to the hauling of all materials except fuel and fuel products.

Rates for haulage by the hour, including driver, range as follows: 1½ to 2 tons, $1; 2 tons, inclusive, to 2½ tons, $1.25; 2½ tons, inclusive to 3½ tons, $2; 3½ tons, inclusive, to 5 tons, $2.50; 5 tons, inclusive, to 6½ tons, $2.75; and 6½ tons and larger, $3.

The rate for haulage by the ton, including driver, is 12 cents for the first mile of each trip and 4 cents for each succeeding mile.

•

INDIANA

R.R.'s Denied Increase in Rates

THE Interstate Commerce Commission recently denied the petition of a group of Indiana railroads requesting that intrastate rates on certain commodities be increased an amount corresponding to the increase allowed on interstate movement in the Emergency Freight Charge case, decided earlier this year by the Commission.

The public Service Commission of Indiana refused to allow the roads to put the higher charges in effect, and the commission upheld this action. The rates would have applied on canned goods, animal and poultry feeds, waste paper, paperboard and related articles, and bituminous coal.

The Commission found that the intrastate rates already in effect "are not shown to cause any undue or unreasonable advantages, preference or prejudice," against interstate commerce.

•

NEBRASKA

Gas Tax Ruled Unconstitutional

THE Supreme Court of Nebraska has ruled the 1c per gallon increase in the state's gasoline tax unconstitutional. The increase was passed last March. The entire revenue from the increase, estimated at $3,000,000 annually, was to have been diverted to other than highway purposes.

The suit testing the validity of the increased levy was brought by Calvin J. Stover, a taxpayer, in behalf of himself and other taxpayers. The tax was temporary and would have automatically expired on June 30, 1936. Approximately $1,200,000 had been collected as a result of the increase during the six months it was in effect, but no decision has yet been made by state authorities as to the disposition of the money.

•

NEW JERSEY

Alleged Tax Invader Fined

JUDGE Elmer Woods, sitting in the Gloucester County Court, Woodbury, N. J., has sentenced an oil company to a fine of $750 and costs. The company was charged with violating the gasoline tax law by filing false statements of name and residence in connection with the purchase of motor fuel, according to The American Petroleum Institute.

Linwood Lord, Gloucester County prosecutor, successfully handled the case for the state. Since the verdict, the oil company has surrendered its distributor's license and is purchasing all gasoline in the future on tax-paid basis.

•

NEW YORK

Expressmen Oppose Control Bill

VIGOROUS opposition to the passage of a regulatory law for New York State was made by W. W. McBride, representing the Express Owners Association of New York City, at recent hearings held on the bill.

The proposed legislation would exempt carriers in cities and within a five-mile radius, as well as carriers in towns and villages. It would be applicable only to inter-city operations. As the legislation is now drawn, it will prevent a local truckman from extending his operation beyond the five-mile radius of the city or village.

The representative of the Express Owners Association argued that if regulation carried any benefits for the operator, such regulation should be extended to the local draymen.

•

PENNSYLVANIA

"Lessors" Held Not Common Carriers

THE Public Service Commission of Pennsylvania in a recent decision held that lessors of trucks are not common carriers within the jurisdiction of the Commission.

The decision was made when an operator, in seeking to renew his certificate, asked for the removal of certain restrictions and the granting of additional rights.

Under the facts presented, it appeared that in addition to doing common carrier service, the certificate holder leased trucks to two large shippers; in each instance these shippers employed their own drivers. In passing upon this, the Commission said:

"The fact that the trucks used in the service are owned by the applicant does not make such operation common carriage within the jurisdiction of this Commission, provided the trucks are actually operated by the shipper and not by the applicant."

A similar ruling was recently laid down by the Texas Supreme Court, as reported previously in this department.

•

TEXAS

Gas Tax and Farmer Exemption Bills

A BILL that would have exempted farmers and merchants hauling their own merchandise from regulation by the State Railroad Commission was killed last month before the first called session of the legislature ended.

The measure was held out of order on the ground that the Governor did not call the session to consider highway legislation.

Another measure, which would have increased the gasoline tax 1 cent per gallon, also died on the calendar.

The only bill affecting highway transportation which was enacted increases the penalties for driving while intoxicated.

Immediately after the first called session ended, a second was called by the Governor. Proponents of the increased gasoline tax, which would bring the total state impost to 5 cents per gallon, have indicated they will continue their drive for enactment of such a bill.

Why Your Dollar Buys More Truck

(*Continued from page* 44)

may be said that virtually all truck manufacturers shared in this progress.

The steady improvement in commercial vehicles during the past few years has practically compelled the truck operator to replace old, inefficient equipment with the latest type of truck at a price much less than he paid originally. The steady upward curve in truck sales this year proves definitely that he is taking full advantage of this situation.

The accompanying table has been built up by comparing the price, chassis weight, gross weight and payload of Federal 1-1½ ton trucks since 1928, as a typical example. It is presented only to show the radical changes that have taken place in the truck manufacturing industry, and practically any other truck manufacturer's figures, if similarly charted, would show a corresponding trend. And the figures themselves give a vivid picture of the value being offered to fleet operators, by the various truck manufacturers, today, as compared with that of but seven years ago.

For example, take the price per pound of payload capacity, as shown in the last column of the table. In 1928 fleet operators paid around fifty cents per pound of payload capacity; in 1935 they pay approximately ten cents for the same thing.

That this reduction is not merely a mark-up in ratings is proven by the fact that today's 1½-ton truck chasses weigh in the neighborhood of 3,500 pounds, as compared to about 2,400 pounds in 1928—an increase of nearly 50 per cent.

Notice the reduction in price per pound of the steel and rubber that go to make up the chassis. In 1928, operators paid in the neighborhood of forty-two cents per pound of chassis weight, while today they pay something around eighteen cents per pound.

These figures show the tremendous efforts of the truck manufacturers (and again we say, all of them) to meet the challenge of a depression period which demanded more and more value for a constantly decreasing price.

Today the price per pound of chassis weight is at the lowest figure it has ever been since trucks were first made. These prices still remain, generally, at "depression prices" in spite of rising costs of materials and labor.

In the face of rapidly rising prices of all other commodities, whether or not low automotive prices can be maintained, is a question that only the future can decide. That fleet operators realize that today's motor trucks (any make) are bargains, is reflected in recent figures of truck sales.

●

New Ford Trucks for 1936

(*Continued from page* 48)

reduce steering effort, the steering spindle arm has been made longer to provide increased leverage. Friction in the steering gear itself has been materially reduced by the use of roller bearings on the sector shaft and lapped surfaces on the worm and sector. An adjustable type of drag link is used to enable accurate setting of the steering gear in relation to the straight ahead position of the front wheels.

The shift lever has been moved forward and changes made in the shifting mechanism reduce the amount of travel required at the top of the lever to shift into any speed. Quiet helical-cut gears have been adopted for low and reverse. Gears of this type were previously used only for the constant mesh and second speed gears. To accommodate the use of helical gears for all speeds, the transmission, main or sliding shaft is helically splined. With these improvements, the transmission is now quiet in all speeds.

The new wheels used on Ford commercial cars have a center section which is formed by cold-pressing plate steel which is .11 inch thick, as thick as the material used for the frame members. This cold pressed-steel center section is provided with great strength because of its U-shaped sections and returned edges. It is electrically-welded to the rim at each of its fifteen spoke-shaped ends. The new wheel is as strong as the previous Ford welded spoke wheel and weighs approximately five pounds less. The use of these new welded one piece steel wheels results in a total reduction in unsprung car weight of almost twenty pounds which is a decided advantage.

●

Studebaker's New Cab Forward Models

(*Continued from page* 51)

be used.

The Metro Boss, of 2 to 3-ton capacity, will be powered by the Waukesha 262 cu. in. engine developing 176 pounds-foot torque and 80 horsepower at 3000 r.p.m. This unit is to be equipped with a special wide Timken front axle and will provide an unusually short turning radius. A Timken full-floating rear axle is to be used.

The Duo-Servo hydraulic brake system will be continued on all Studebaker truck models. A larger and improved type clutch will be used in both the Metro Ace and Metro Boss trucks, the factory states.

Listed below are the wheelbases and recommended body lengths for the 1½ and 2-ton cab-forward trucks:

1½ TO 2 TON METRO ACE

Wheelbase	Cab to Axle	Recommended Body Lengths
101″	60″	9′
125″	84″	12′

2 TO 3 TON METRO BOSS

101″	60″	9′
125″	84″	12′
157″	116″	16½′

Production of these two new truck models is expected to begin in December of this year. The prices of Studebaker Metro Models will be slightly higher than the prices of Studebaker's conventional truck models.

More information can be obtained by addressing your inquiry to Mr. W. H. Edwards, General Manager of the Truck Division, The Studebaker Corporation, South Bend, Indiana. . . . And if you mention FLEET OWNER when writing, it will help to identify the source of your inquiry and speed up the service.

●

Experienced Fleet Mechanic Available (Adv.)

FIRST class fleet mechanic desires position with car or truck fleet in Metropolitan New York. Can take full charge or assist. Thoroughly experienced on most makes of cars and trucks. American—white—Age 26. Have complete set of good tools. Previously with small milk company fleet.—Address D. G., c/o Editor, FLEET OWNER, 90 West St., New York City.

Preventive Maintenance Pays and Pays

(*Continued from page* 20)

in after a day's work, their activities are checked up by means of Servis Recorder charts, one of these instruments being installed in each truck. Thus a constant "on the job" record is kept of the operation of each vehicle and an opportunity is given the management to check up on not only the activities of each driver, but also on the routes, number of stops, etc., that each truck does in its daily work.

●

Our Experience With Self-Insurance

(*Continued from page* 25)

tion for one year.

This inflexible, yet impartial manner in which our company deals with the phase of driver responsibility in accidents has greatly reduced the number of serious accidents in our fleet. . . . Probably because each driver has been made to realize that he must be always on the alert to *prevent* accidents.

Our Claims Department is an important factor in our company for building up and maintaining the good will of the public. When we were insured with a stock insurance company, it was the object of that organization to settle all claims as cheaply as possible, because their profit, naturally, depended on the difference between the premiums paid in, and the claims paid out.

Of course, the stock company would give some consideration to building up and maintaining good-will for our company, but they would not, and *could* not be as interested in keeping up our goodwill as we are.

As "self-insurers" we have gradually increased the scope of passengers' claims, until now we settle such claims as "a pair of silk stockings" or for the cleaning of an item of clothing damaged or soiled (or alleged to be) on one of our vehicles. The only hesitation we make is that in assuring ourselves that the damage was really done on one of our vehicles.

We have established a policy of paying all incidental claims of this sort immediately, except in cases where it is absolutely clear and positive that we were not at fault. At first we were somewhat apprehensive that we would be deluged with small claims as soon as it became known that we would settle them, but it was very gratifying to find our public so fair-minded, and the number of "grafters" so small.

We have also found it very good policy to be liberal with the services of our own maintenance department, in straightening out, and touching up the fenders of other people's automobiles which were damaged by contact with our vehicles—even though the accident was only 1 per cent our fault.

It has been found that prompt and courteous attention, and quick payment of these usually so-called "nuisance claims" results (in 99 out of 100 cases) in our gaining a sincere friend and steady patron, who afterwards is much friendlier and more "tolerant" toward us than he ever was before, because he has found us to be more "human" than he ever expected.

As a matter of fact, some of our associates have suggested that these small sums paid out in settling minor claims should really be charged to our advertising appropriation, rather than taken out of the insurance fund.

We also have an arrangement with a centrally-located hospital, whereby they attend to all passenger and employee injuries. We see to it that each person hos-

DUAL Safety STOP-LITE

WIG- **WAG**

Combination Tail Light and Stop Light

The Stop-Lite That Speaks With Action

For Trucks, Buses and Trailers

U. S. Patent Nos. 1976543—1675070—Other patents pending.

For Passenger Cars, Trucks, Buses and Trailers

A signal with action which compels attention and greatly lessens the danger of rear end collisions. Tail light of standard type with a strong penetrating stationary red light; stop light operates whenever brakes are applied, bringing into view a red light which wig-wags from side to side, visible from both sides and rear.

Read the experience of MARKEL SERVICE:

"September 3, 1935

"Safety Signal Devices, Inc.,
5031 Broadway Ave.,
Chicago, Illinois.

Gentlemen:

After giving your Dual Stop-Lite a complete tryout for the last 12,000 miles, and speaking as a safety engineer we recommend the use of this light in eliminating rear end collisions on the highway. The moving signal wig-wagging calls attention to equipment following, in such manner that it serves its purpose in a far better manner than the ordinary stop light.

The practicability of the Dual Safety Stop-Lite is outstanding; it is easily and quickly installed without any special tools or rearrangement of wiring and the increased safety value of such a light on an automobile or truck is obvious as the moving red light is many times more visible than a stationary one.

We have found this light is visible from both sides as well as the rear which is an added recommendation for this type of warning. We recommend its use for passenger cars, trucks, buses, toward the elimination of rear end collisions.

Yours very truly,
(Signed) MARKEL SERVICE, INC.,
C. C. Rosenbarger, Division Manager."

For Passenger Cars

SAFETY SIGNAL DEVICES, INC.

5031 Broadway Avenue Chicago, Illinois

LOWEST
TIRE-MAINTENANCE
COST
PER VEHICLE

with Schrader Valve Cores *

AND

** Schrader Dublcheks

Schrader Dublcheks save valuable time in servicing tires. Leading bus fleets, equipped with these ingenious "inflate-thru-cap" Dublcheks, save about half the time formerly needed to properly inflate and check tires. For instance, if it took 6 to 8 minutes per vehicle the old way, it now takes 3 to 4 minutes the "Dublchek way."

Ask your supplier to quote on your requirements.

A. SCHRADER'S SON, BROOKLYN, N. Y.

Division of
SCOVILL MANUFACTURING COMPANY
Incorporated

* SCHRADER VALVE CORE—standard of the tire industry, and the fastest inflating, most rugged, and dependable valve core made.

** SCHRADER DUBLCHEK CAP—the plier-attached Valve Cap that can't shake loose. Saves time—inflate right thru cap. A guaranteed airtight secondary air seal—protects valve mechanism from dirt and injury

Schrader
REG. U. S. PAT. OFF.

TIRE-SAVING VALVES, CAPS, GAUGES AND AIR-SERVICE EQUIPMENT

pitalized on our account receives only the best and most considerate attention while in the hospital.

We are giving this report of our insurance experience because we think it should be of interest to anyone making a survey of the subject; also to other fleet operators, everywhere. However, the thing to remember is that general conditions are quite different in this part of the world, than they might be in New York, Chicago or San Francisco, for instance. But we are glad to pass on this information for whatever it may be worth.

●

Buda Automotive Diesel Engines

(*Continued from page* 30)

bulence, which is divided in such a manner as to create a right and left rotary motion in that lobe under each respective valve.

"This self-induced turbulence so thoroughly mixes all atomized fuel with its proper air content that this type of combustion has been proven to operate under all ranges of speed and allowable load up to rating, on the minimum of excess air.

"This system of induced turbulence from internal means gives what has been long sought for as the substitute of air injection effect in solid injection engines. It gives accelerated burning and progressive rise in pressure by accelerating the end of the combustion cycle instead of the beginning. It makes it possible more nearly to approach the character of gasoline combustion.

"Due to their design of combustion, Buda-Lanova engines start easily in cold weather, through the medium of glow plugs of low voltage capacity."

All Buda Diesel engines are equipped with full-pressure lubrication to all crankshaft bearings, connecting-rod bearings, valve rocker arms and timing gears. A wet sump system is employed, with gear-type oil pumps. All fuel and lubricating oils pass through ample sized filters which are accessible for cleaning from the outside, and all lubricating oil on the Lanova job passes through an oil-cooler located ahead of the water pump.

Crankshafts of all Buda Diesels are drop-forged in dies, and are statically and dynamically balanced, with ground bearing surfaces, and drilled for pressure lubrication. Connecting-rods are of drop-forged alloy steel, heat-treated and balanced. Valves are located in the cylinder heads, and are operated by push-rods and pressure-lubricated rocker-arms.

Cylinders and crankcases are in one casting of chrome-nickel iron, ribbed to insure rigidity and alignment of bearings. Cylinder liners of the removable, dry-sleeve type are used, pressed in, and can be easily removed and replaced in the field, the makers state. They are made of molybdenum iron, ground finish. Cylinder head covers are made of aluminum alloy, and can be detached by removing thumb-screws. Pistons are of aluminum alloy, with five or six rings. Piston pins are of the full floating type. Timing gears, made of special molybdenum castings, are used.

Starting and lighting equipment is furnished, consisting of electric starter, 24- or 32-volt automotive-type starter, and 24- or 32-volt, voltage-regulation generator, also of the automotive type.

All Buda Diesel engines are furnished with S. A. E. standard flywheel bell-housings, exhaust manifold flanges, mounting pads, etc., etc. If you would like further information covering the operation and installation details of Buda Diesel engines, address The Editor of this publication, who will be glad to see that your request is handled promptly and without obligation.

Hercules Automotive Diesel Engines

(*Continued from page* 32)

Hercules gasoline engines of similar series, thus providing an opportunity for truck manufacturers to offer either gasoline or Diesel engines in their equipment, without any mounting complications.

It is not possible to more thoroughly describe these Diesel engines in this issue, on account of space limitations. However, Hercules Motors Corporation has issued a very elaborate "Diesel Book" that illustrates and describes the entire line. If you'd like a free copy of the Hercules Diesel Book, just drop a line to the Editor, and one will be mailed to you promptly, and without obligation.

●

Waukesha Automotive Diesel Engines

(*Continued from page* 34)

specifications of Waukesha Comet Diesels follow:

Cylinder Heads—Singly cast of special alloy with Comet combustion chamber inserts, easily removed to provide for change in compression ratio with no other alterations.

Crankcase—Patented "girder-type" crankcase with large box-section base flange. Crankshaft carried in upper half.

Cylinders—All six cast in one block of high-test "molychrome" iron. Patented non-rocking type. Support flange at base of water jacket (6-D-100 only). The 125 h.p. and 140 h.p. jobs have removable cylinder sleeves (wet type) of special molychrome iron.

Pistons—Aluminum alloy, heavily ribbed, with five rings and full-floating piston pins.

Crankshaft—Chrome molybdenum, heat treated steel of great hardness. Seven main bearings.

Connecting Rods—S.A.E. 1045 heat treated steel. Large end ground to fit precision-type bearings; caps held by 7/16" heat treated bolts.

Main and Rod Bearings—Replaceable steel backed precision-type bushings with high lead bronze lining.

Valves—Located in cylinder head; intake, chrome nickel; exhaust, chrome silicon. Inserts in both intake and exhaust valve seats.

Valve Tappets—Screw and lock nut type on rocker levers. Entire valve-mechanism enclosed and flood oiled.

Timing Gears—Helical cut gears of mild steel and alloy iron; fully enclosed and flood oiled.

Cooling—Positively driven water pump. Thermostat maintains most efficient operating jacket temperature.

Lubrication—Positive gear-type oil pump submerged in oil supply circulates oil to every moving part. Full pressure reaches all rocker arm, main, connecting rod, piston pin, camshaft, auxiliary shaft, and timing gear bearings. Oil Level Equalizer insures positive supply of oil at all levels and temperatures.

Oil Filter—Bleeder type oil filter cleans lubricating oil continuously.

Fuel System—Single unit, 6-plunger solid injection pump. Injection pressures 1500-2500 pounds per square inch.

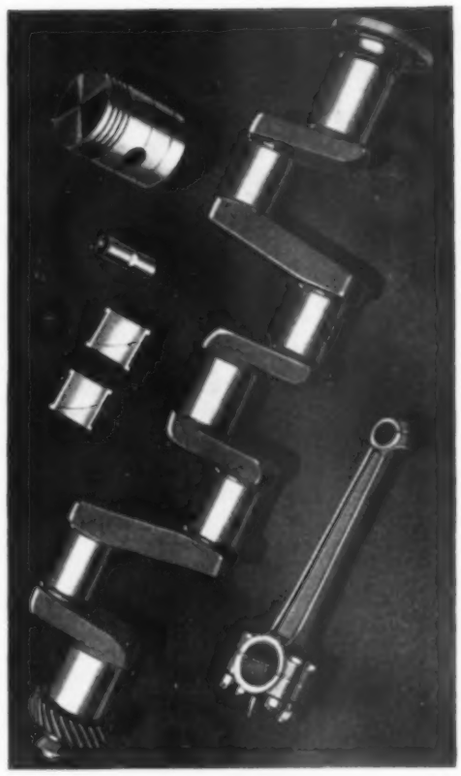
Governor—Speed control governor is built into the engine, and limits maximum engine speed.

Fuel Filter—Fuel injection pump and nozzles are protected against wear by a twin unit filter which may be cleaned without stopping the engine.

Fuel Feed Pump—Positively driven feed pump delivers fuel from storage tank to solid injection pump.

Electric Starting Equipment—Single starting motor with Bendix drive and ring gear, 400-watt voltage reg-

(*Please turn to page* 67)



For Fleet Protection

The vitals of the modern automobile engine must function under increasingly gruelling conditions. Protection of these parts is essential.

Fleet owners should be especially interested in seeing that their trucks go out with every precaution taken to insure good performance.

An important step in this direction involves the use of an adjunct oil containing "dag"* Brand colloidal graphite. No matter how carefully machined, ground or honed the friction parts have been, they still are surprisingly rough. With the use of Acheson's colloidal graphite, a smooth, self-lubricating graphoid surface is established on the parts. This surface reduces metal-to-metal contact during cold starting and when oil film rupture occurs due to high temperatures and heavy pressures.

Write for Bulletin G242 describing why Acheson's colloidal graphite is valuable as an auxiliary lubricant for alloy bearings.

You are cordially invited to visit our Booth 4 at the Detroit Automobile Show, Nov. 9-16.

*Reg. U. S. Pat. Off.

REG. U.S. PAT. OFF. dag COLLOIDAL PRODUCTS

ACHESON COLLOIDS CORPORATION

FOUNDED (1908) AS ACHESON OILDAG COMPANY

PORT HURON • MICHIGAN

UTILITY Six Wheel Attachments are *"TOPS"* in Third Axle Equipment

"Tops" because they are built to certain definite principles; providing correct placement of the third axle for proper weight distribution; providing for drive wheel traction to increase with application of driving power; providing four point suspension to prevent undue strain on the frame; providing simplicity of construction and simplicity of installation.

Thru more than ten years that UTILITY third axles have been in production and service, these principles have never been changed except to refine and adapt the equipment to modern truck construction.

UTILITY distributors in all trucking centers can demonstrate savings in truck operations with UTILITY Six Wheel Attachments.

Write for descriptive folder and name of distributor nearest you

Utility Trailer Mfg. Co.

Box 1407 Arcade Annex Los Angeles, Calif.

Oakite Industrial Conference

NEARLY 100 field service representatives of Oakite Products, Inc., will meet at their headquarters office in New York, December 9th to 13th, to attend the Oakite Annual Technical Sales Conference. . . . A large number of technical papers will be read, dealing with the cleaning problems of different industries. . . . Mechanical improvements in production equipment that have occurred during the past year have made necessary many changes in cleaning methods and materials. . . . The object of the Conference is to interchange ideas so that Oakite representatives may be more helpful to the industries which they serve.

•

Acetylene Assn. Meets in Cleveland

THIS year the International Acetylene Association is to hold its 36th Annual Meeting in Cleveland, Ohio. The date is November 12th to 15th inclusive, and the place is the Hotel Cleveland. . . . As an added feature, a Welding and Cutting Forum is being arranged, in which numerous demonstrations will be made and nationally prominent speakers will participate. . . . Many interesting papers on acetylene welding and cutting will be presented.

•

Heroux Heads Paint Division

PROMOTION of A. E. Heroux to the position of general manager of the Permite Paint Sales Division of Aluminum Industries, Inc., is announced. . . . Mr. Heroux succeeds A. B. Anderson, who recently resigned.

•

Brake Lining Sales Improve

IN the first quarter of 1935, manufacturers' sales of brake linings and clutch facings showed an increase of 20% over the same period in 1934, according to figures announced by the Brake Lining Manufacturers' Association, Inc. Sales for the first quarter of 1935 were $5,013,800 compared with $4,178,100 in the previous year. The increase is attributed largely to the increase in automobile production, the buying for which is usually concentrated in the first part of the year.

SELF-CLOSING MONKEY LINK

Pat. No. 1,438,560
Trade Mark Reg. in U. S. Pat. Office

FREE Samples To Fleet Owners

Self-Closing Monkey Links

Write us for free samples, state how many trucks there are in your fleet and what size they are. We will mail samples immediately.

Why Buy New Chains? Repair With Monkey Links

Your chains aren't worn out when the cross links start to let go. Repair with Monkey Links. Your drivers can do it on the road. No tools required. No appreciable time lost. Chains as good as new. Save money. Increase safety. Send for your FREE SAMPLE now.

Flower City Specialty Co.
ROCHESTER, NEW YORK
At All Reputable Jobbers

The BIG LIFT

Here's tremendous power, wide range, easy operation—in a full line of hydraulic jacks, hand and floor types, from 1 to 75-ton capacities. For floor, curb, road, and shop use — Buy Blackhawk. Ask your Jobber Salesman. Write us for literature.

Blackhawk Mfg. Co.
Dept. F. O. 11 Milwaukee

BLACKHAWK HYDRAULIC JACKS

Waukesha Automotive Diesel Engines

(*Continued from page* 65)

ulation generator, 24 volts. Magnetic main, and push button auxiliary, starting switches, generator regulator, combustion chamber glow plugs and connections are also furnished—no battery wiring, or other details.

Air Compressor—(Extra) Westinghouse six-foot air compressor and compressor drive, can be supplied for air brakes.

Intake Silencer and Air Cleaner—(Extra) Burgess-type intake silencer, and oil-type air cleaner can be supplied.

Space does not permit a more thorough description of these engines, but if you would like to get literature that does the job more thoroughly, we'd be glad to obtain it for you. Waukesha has published a booklet entitled "What is a Diesel?" that asks and answers many questions that you may have in mind. Additional literature covers the complete line of Waukesha Diesels. . . . These may be obtained free of charge by addressing The Editor, FLEET OWNER, 90 West Street, New York City.

●

How 87 Fleets Select Air-Cleaners

(*Continued from page* 38)

problem, the oil-filter situation, the brake picture in fleets, etc., etc.

Believing this a good opportunity to have our judgment corroborated, we managed to squeeze in the following question: *"Have recent dust-storms seriously affected your own particular fleet operation?"* . . . And we were pleased to note that only fourteen operators replied in the affirmative; the balance being not so affected.

We further learned, in the few isolated cases where dust-storms were particularly severe, that no serious trouble was encountered, so long as the air-cleaners were cleaned out at the end of each day, and so long as the crankcase oil was drained daily, oil-filter cartridges watched, and the vehicles carefully operated during the duration of such dust-storms.

When the time comes that dust-storms will constitute a *national* menace, (we hope it won't) you can rest assured that Brother Fischer will be on the job with dope as to the best way to overcome them. So long as they remain a purely local problem, we won't have the opportunity of doing anything about it, except to advise the use of a good air-cleaner and a good oil-filter, and the proper and judicious servicing and attention to both of these valuable accessories.

And that, folks, is the story on Air-Cleaners. We will repeat that these questionnaires are conducted solely for the fleet man's benefit. The information in them is "confidential business" and only those who participate in them are really entitled to the "confidential" summaries which follow them. In these summaries you get *all* the "meat"—trade-names, brands preferred, and everything. So why not start out today and become a regular "member" of our Question-of-the-Month Club? . . . The questionnaire is on page 53 of this issue, and there will be a new one every month. So much for that.

Undoubtedly many fleet operators (and manufacturers) who read this article will wonder just how *representative* this "survey" really is, what types of fleet operators participated in it, in what parts of the country they are located, and about how many vehicles each

(*Please turn to page* 69)

Phenomenal New Process—Gets *rid of Grease!*

Makes Repair Jobs *Faster • Easier • Better*

Cleaning dirty, greasy engine blocks or any part is now as simple and easy as filling a radiator with water. No scrubbing, soaking, dirty work or mess. No danger of fire. CircoSolv does the job in ½ to 3 minutes. As if by magic, parts are completely clean and dry ready for inspection and installation. Defects can be seen instantly—your work goes faster, easier, better and more pleasantly . . . . See this phenomenal new inexpensive process at once. On request a demonstration will be arranged without obligation.

CIRCO

CIRCO PROCESS

REX DEGREASER AND CIRCOSOLV

PATENTED AND PATENTS PENDING

CIRCO PRODUCTS COMPANY, Cleveland, Ohio

☐ Please call and demonstrate your new Degreasing Process.

☐ Please send complete information on your new Degreasing Process.

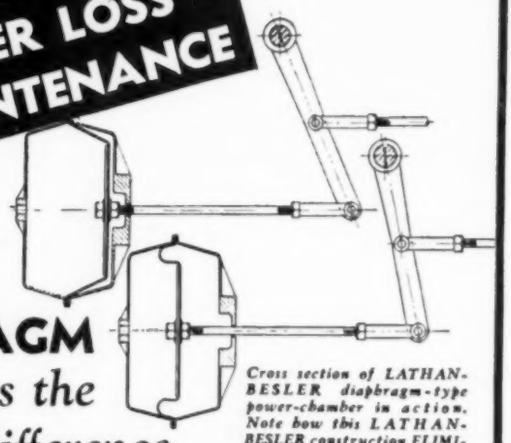
Name .....

Address .....

City ..... State .....

● FASTER ACTION
● LONGER LIFE
● NO POWER COST
● NO POWER LOSS
● NO MAINTENANCE

MORE POUNDS PULL PER DOLLAR



It's the **DIAPHRAGM** *that makes the difference*

Cross section of LATHAN-BESLER *diaphragm-type power-chamber in action. Note how this* LATHAN-BESLER *construction* ELIMINATES FRICTION, *and transmits* FULL *power* DIRECT *to the brake mechanism—in* EQUAL *measure.*

LATHAN
BESLER
POWER BRAKES

LATHAN-BESLER Power Brakes for every truck and trailer. Package outfits as low as **$25** LIST

New LATHAN-BESLER catalog now out. Write for a copy TODAY!

You KNOW that you speed up action, increase power, and save money when you ELIMINATE FRICTION. LATHAN Co., Inc., has perfected a DIAPHRAGM-TYPE brake power-chamber that is FRICTIONLESS in operation. That is one of many reasons why LATHAN-BESLER power brakes give you MORE power, QUICKER application—and require no lubrication, no maintenance. NATION-WIDE sales and service. You have the vacuum power in your engine now—why not USE it? Write TODAY for new LATHAN catalog.

A LATHAN product

LATHAN SINCE 1911

LATHAN CO., Inc.

SAN FRANCISCO - Polk and Pine Sts. DETROIT - 477 Selden Ave.

Fleet Man's Day at A.S.I. Show

SPECIAL arrangements have been made to entertain the maintenance trade and fleet owners in a 200-mile area surrounding Atlantic City at the Automotive Service Industries Show on Friday, Dec. 13.

The Show will be open from 9:00 A.M. until 10:30 P.M. on that day to permit the service trade to contact all of the exhibiting manufacturers and to get a complete line on all of the new products that will be on display. In addition to parts and accessories, they will have a chance to watch demonstrations of new tools and equipment designed to help them do their work more efficiently at less expense.

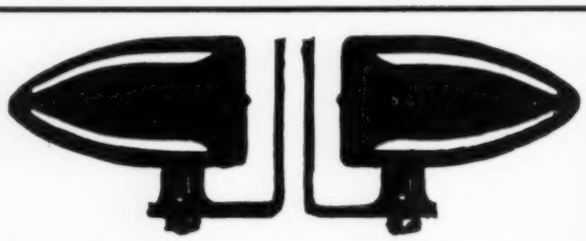
Also the Show will give the visitors an unparalleled opportuinity to get a first-hand, bird's-eye-view of the tremendous manufacturing and wholesaling industry that stands back of the merchandise displayed in the stores of the jobbers with whom they are doing business daily.

Tickets will be distributed by all N.S.P.A. and M.E.W.A. jobbers within easy driving distance of Atlantic City and it is expected that some of these jobbers will take bus loads of their customers to the Show on this special day. (P.S.—Write the Editor if you'd like some free tickets.)

•

Ford Offers Lincoln "Zephyr"

THE newest entry in the medium-priced car field is the Lincoln "Zephyr"—a 110 h.p., V-12 job with 122-inch wheelbase. . . . Besides being quite streamlined, the new car introduces a new type of body, in which no frame or chassis is used, the engine and running gear being assembled directly to the body, which is a rigid, load-carrying structure. . . . Two models are offered, so far—a 2-door and a 4-door sedan. The spring suspension is basically similar to that used in Ford V-8 cars. . . . The engine is a V-12 of new design with cast alloy-iron pistons.



Simple in Operation Easy to Install
Reasonable Prices

Approved by Penn., Conn. and other states

TURNSIGNAL
CORPORATION

400 East Rittenhouse St., (Germantown) Philadelphia, Pa.

ARMORPLY

A SUPERIOR METAL FACED PLYWOOD PANEL FOR BODY CONSTRUCTION

Write for samples and prices

UNITED STATES PLYWOOD CO. INC.
603 W. 36th. ST. NEW YORK CITY

How 87 Fleets Select Air-Cleaners

(*Continued from page 67*)

of them operate? So here is a breakdown of the 87 operators who participated; God bless 'em!

There were 13 trucking companies, 10 petroleum fleet operators, 8 public utilities, 7 bus operators, 6 meat packers, 5 dairies, 5 state highway fleets, 4 contractors, 3 manufacturers, 3 county departments, 3 grocers, 3 bakeries, 2 department stores, 2 taxicab operators, 2 ice-and-coal fleets, 2 bottling companies, 1 municipality, 1 laundry, 1 telephone company, 1 brewery and 5 miscellaneous fleets.

Fleet operators from 32 states in the Union participated, including some from as far West as California, Oregon and Washington; as far North as North Dakota; as far South as Florida and Texas; and as far East and North as Maine. So you see, gentlemen, this information is *quite* representative.

"Were they small fleets or large ones?" someone is bound to ask. The answer is that they were *all sizes* of fleets. Some had fifteen, and some had several hundred vehicles. In fact, the *average* number of vehicles per participating fleet is about 171. The vehicles themselves are distributed as follows: 9,013 trucks and tractors, 1,373 trailers, 3,140 passenger cars, 315 buses, and 1,106 miscellaneous vehicles. Adding them all together, the grand total is 14,947 vehicles.

As stated previously, we have made a typewritten tabulation of this survey, for easy reference. Copies have already been furnished to those operators who participated in it. We have a few more on hand, which we will be glad to furnish, gratis, to any interested fleet operators, even though, technically, they are not entitled to it. However, since one can "catch more flies with honey than with vinegar," we are waiving our rule in this instance, the thought in mind being that perhaps after an operator once *sees* what he will get, in return for a few minutes' work each month, he will feel more like participating in a very worthy cause.

On page 53 of this issue, there is a questionnaire on a *new* subject. A new subject is "surveyed" each month. This work is done primarily for the fleet operator's benefit, and if *more* operators would participate, it would please us greatly. All you have to do is turn to that page, fill out the blank, and mail it in to the Editor, who happens to be Yours Truly. If you cannot answer all of the questions, just answer those you can, and leave the rest blank.

In return for your efforts, we will send you a tabulated, typewritten resumé of all the answers. Many operators have told us that they save these tabulations, filing them directly under the subject discussed, where they will be handy for future reference. This month the questionnaire covers "Shop Equipment." It's on page 53, gentlemen. We'd appreciate your cooperation. The more, the merrier; and the more *representative!*

●

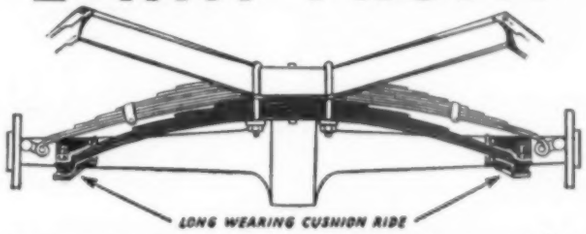
How's This for High Vehicle Mileage?

FEW cars in the "Silver Fleet" of The B. F. Goodrich Company, operated continuously in tire testing, are ever retired from fleet service, and turned in for new models with less than 200,000 miles on their speedometers.

Frequently they attain records of 350,000 miles before they are traded. The greatest mileage ever recorded in the "Silver Fleet" was 715,000, established by a truck.

New TRAINOR
1/2 TON HELPERS
for FORDS

GIVE YOU AN EXTRA
2-WAY PROFIT



They're money-makers—these new Trainor helpers—regardless of the number of trucks you operate. Try them out and you'll find they will add to your payload income and cut your repair and maintenance expense—real extra profit, two ways. New half-ton models—easy to install . . . ½ to ¾ ton extra payload. Model illustrated No. F705 for 1935 Fords, price per set, $15.00.

ALSO COMPLETE LINE OF 1½-TON AND LARGER HELPERS AND OTHER ½-TON MODELS FOR ALL MAKES OF TRUCKS

Liberal Discounts to Fleet Owners

TRAINOR NATIONAL SPRING COMPANY
New Castle, Indiana

Write for Complete Information and Prices

3 WAYS
to make your refinishing easier less expensive

PERMACEL
The perfect paper masking tape that applies easily . . . stays put in all kinds of weather. Precision edges give clean, hair-line color separation in less time . . . at less cost.

JONFLEX
A finely-woven cloth tape, long the standard in the industry. Like all Revolite tapes, it handles easily, sticks in all weathers. Straight-as-a-die edges assure exact color separation. Pulls off fast and clean . . . no touch-up necessary.

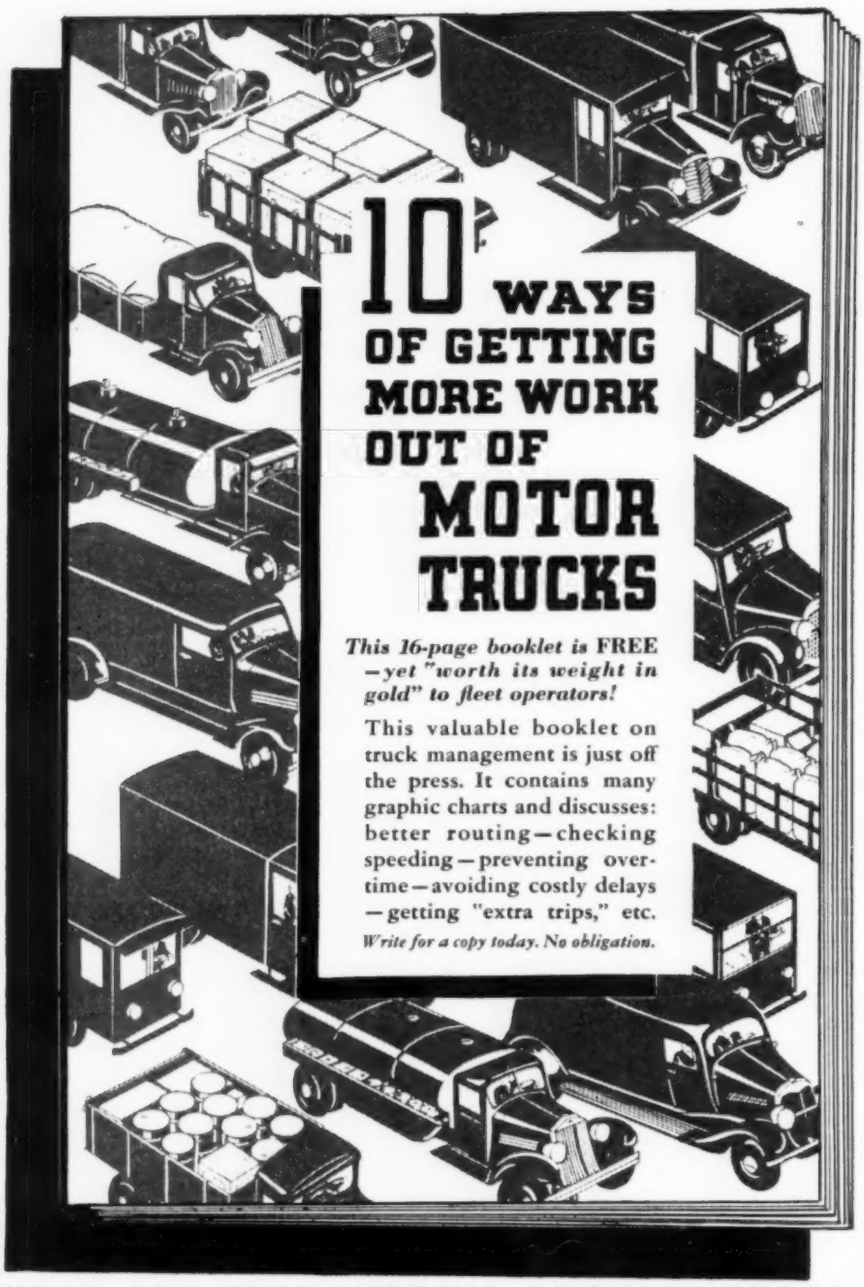
INDUSTRIAL
Heavier, stronger, coarser-woven cloth backing; in all other respects duplicates Jonflex in production results.

THE REVOLITE CORP.
A Subsidiary of Johnson & Johnson
NEW BRUNSWICK NEW JERSEY

FREE

Without cost or obligation, send me a free USEABLE roll of Permacel. All Revolite tapes come in sizes ¼" to 36" wide in 60-yard rolls.

NAME .....
ADDRESS .....
TOWN AND STATE .....
NAME OF JOBBER .....


10 WAYS
OF GETTING
MORE WORK
OUT OF
MOTOR
TRUCKS
This 16-page booklet is FREE —yet "worth its weight in gold" to fleet operators!
This valuable booklet on truck management is just off the press. It contains many graphic charts and discusses: better routing—checking speeding—preventing overtime—avoiding costly delays—getting "extra trips," etc.
Write for a copy today. No obligation.

SEND FOR THIS HELPFUL BOOKLET TODAY

IT'S FREE

The Service Recorder Co., 456 Hanna Bldg., Cleveland, O.

Heavy-Duty LeTourneau Trailer

A 20-ton semi-trailer designed particularly for transporting heavy equipment, such as compressors, tractors and tractor equipment, or general construction tools, is announced by R. G. LeTourneau, Incorporated, Peoria, Illinois, and Stockton, California.

This trailer is mounted on sixteen 8¼ x 20 pneumatic tires. Double oscillating walking-beams keep the bed level and force each tire to carry its portion of the load regardless of road inequalities. As a result, extremely rough ground, such as is so often encountered on construction jobs, may be covered without danger of upsetting the load, it is claimed.

Big tires and heavy duty Timken Bearings make for a very light draft. On good roads and moderate grades, a 1½ ton truck will easily handle the LeTourneau semi-trailer loaded with a 75 h.p. tractor, weighing approximately 33,000 pounds, the makers state.

This unit is built to handle like a 2 wheel trailer, consequently, is easily maneuvered and spotted. It has a very short turning-radius and can get in and out of narrow quarters very easily. A long hook-up enables the truck driver to back rapidly, yet have the trailer under perfect control, according to factory officials.

The weight of the LeTourneau semi-trailer is 7,290 pounds. The bed is 100 x 144 inches. Length over all is 212 inches.

•

AC Launches Plant Expansion

THE largest plant expansion program in the history of the AC Spark Plug Company, involving new manufacturing facilities and the installation of new equipment throughout the plant, was recently completed, after the start of the expansion program many months ago. . . . The new plant layout makes for better working conditions, less stock handling, more floor space, enlargement of safety appliances, better ventilation, more modern machinery, new lighting fixtures and several new processes for manufacturing the various items in the AC line.

MARVELOUS NEW PAINT SPRAY GUN

Handles all types paint, lacquer, etc., especially the new synthetic enamels. Lighter in weight, widest spray, perfect atomization, air purifiers, 5 and 10 gallon pressure outfits, accessories, etc.

Write for Catalog.

The Alexander Milburn Company
1411 W. BALTIMORE ST. - - BALTIMORE, MARYLAND

KEEP SLUDGE Out of Motor with FILTERITE

THE IMPROVED OIL FILTER

Filterite uses slow filtration process. **Positively removes water from crankcase,** preventing sludge formation. Keeps oil 99.98% clean. One model fits all motors. Low in cost. Inexpensive cartridge changed by removing **only one bolt.** Used by national fleets.

Write for complete information, prices, discounts. Some territory still open for distributors.

REGA MANUFACTURING CO., 79 Mt. Hope Ave., Rochester, N. Y.

Choosing Friction Materials?

(*Continued from page* 42)

ance characteristics. We feel this article would be incomplete if we stopped at this point without stating that it is one thing to produce a lining in which any *one* of these four performance characteristics may be predominantly in evidence. But it is quite another problem to make a lining where each one of these factors is obtained to the maximum possible extent without compromising or sacrificing to any degree any one characteristic for the other.

We know of only one lining that is complete in every particular insofar as these four performance characteristics are concerned. This lining, unfortunately, is not manufactured by Johns-Manville or any other lining manufacturer on earth (to our knowledge); this ideal material can be found on the Chariot of Jesus Christ! So far, success has crowned the brake lining industry's research efforts in *approaching* this ideal material, that we have gained admittance to St. Peter's taxicab.

Brake mechanisms on the road today, however, do not require linings one hundred per cent perfect in all four characteristics. The brake set up on your trucks may require a particularly quiet lining to prevent squeaks. It may also require a lining retaining a high friction whether hot or cold, new or old, in order to make a satisfactory stop with the cam pressure available. But perhaps, on these trucks, due either to easy service or high grade drums, scoring is not a problem. Thus by proper selection from a standpoint of friction, you can get exceptional results.

On the other hand, you may have a rigid brake assembly where squealing will never be a factor. You may have a booster or air system of such nature that you can easily get a good fast stop. However, your drums are scoring and your lining mileage is low. Here again proper selection of lining, paying attention to the characteristics of durability and lack of scoring, will be of inestimable value.

Again, you may have a specialized problem such as an old model that never did stop quickly enough but you cannot afford to install a booster or air system. Therefore you must select a lining with the highest and most stable friction and not complain very much if the other characteristics of the material are not a hundred per cent perfect.

And as for Mr. "Fast Service Truckman". The simplest way for him to get out of his difficulties is to know these necessary characteristics of friction material ask questions about them. If the lining representative is intelligent and sent out by a firm that offers a complete line and knows what it's all about, Mr. Truckman will get some real help.

●

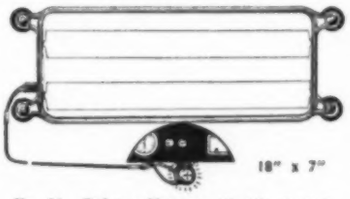
Highway Police to Give First Aid

SEVEN highway policemen, trained to give first aid to the injured, will appear soon on North Dakota's roads.

They will be members of the State Highway Patrol, designed to decrease the toll of dead and injured in traffic accidents.

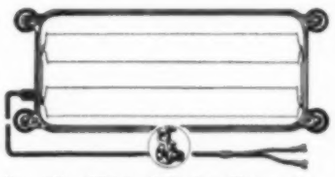
The new patrol will be patterned after Minnesota's set-up. Each of the patrolmen will be thoroughly trained in first aid, in addition to traffic duties. They will carry with them equipment for aiding motorists, not only out of traffic jams and mishaps, but out of more serious difficulties.

With CASCO DEFROSTERS



18" x 7"

No. 51. DeLuxe Chrome with Illuminated Switch—Price reduced to $6.00 List



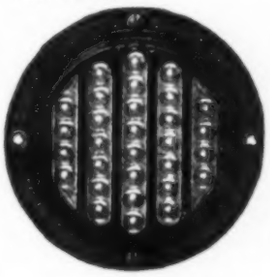
No. 196 16"x7" Defroster—Chrome—includes Illuminated Switch. List $5.00

Other Models from 80c to $3.50.

A complete line of CASCO Defrosters to fit all cars, trucks and buses.

WINTER IS here. Sleet storms come at a moment's notice. Frozen windshield, cloudy vision, delayed schedules, danger lurking in the foreground.

Be sure all the cars, trucks or buses in your fleet are equipped with CASCO Defrosters *before* they start out for the day—or the trip. Keep them always ready for instant use. They will help your drivers maintain schedules or delivery hours, relieve them of cloudy vision and doubtful driving through snow, sleet or freezing rain storms.



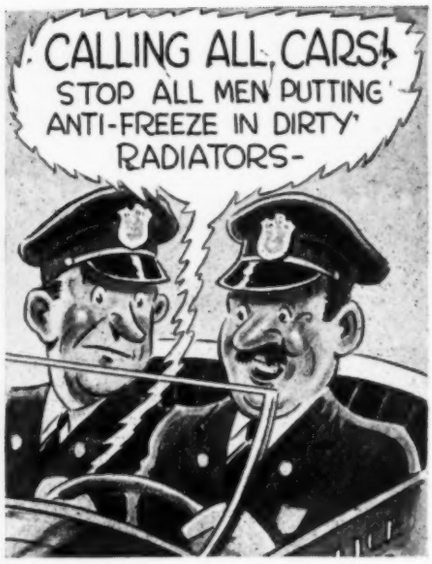
CASCO CATAPHOTE REFLECTORS

These approved type Reflectors will add to the safety of your fleets. The strong warning reflection helps prevent many night accidents. Required by law in many states, but an added precaution everywhere. Attaches easily to truck, bus, or trailer—to any flat surface or by use of bracket, at any desired location or position.

See your wholesale supply house now and contract for your season's requirements, or write us direct for full information.

Casco Products Corp., Bridgeport, Conn.

You can clean out automobile radiators for 6c each



SEND FOR

FREE SAMPLE OF Sani-Flush

Sani-Flush is the ideal radiator cleaner for fleet owners. It does its job quickly and thoroughly for *minimum cost*. It is perfectly harmless and safe. It is not caustic. Cannot damage aluminum cylinder heads, water jackets, radiator or hose connections.

Pour a little Sani-Flush in the radiator. Run the engine. Drain, flush and refill with anti-freeze. That's all!

Send, on your firm stationery, for a generous free sample of Sani-Flush. Write today.

THE HYGIENIC PRODUCTS CO., CANTON, OHIO

One of the Harrison Motor Freight units, operating between Boston and Philadelphia

PROVED PERFORMANCE Throughout the U. S.

CUMMINS DIESELS earned their leadership—and maintain that leadership—solely on PROVED PERFORMANCE. 95% of all Diesels on our highways are CUMMINS Diesels—the only time-tested, proved-performance automotive Diesels in the U. S.

NOW OVER 4,500,000 MILES A MONTH IN HEAVY-DUTY TRUCKS

CUMMINS ENGINE CO., COLUMBUS, IND.
The Leader in Diesel Engineering Advancement

SALES AND SERVICE FROM COAST TO COAST

-LOEBS-

AUXILIARY CARBURETOR

The most amazing adjunct to Economic Motor Operation EVER PERFECTED

REDUCES THE COST OF GASOLINE FROM 2¢ TO 5¢ PER GALLON

ALSO

- Increases power
- Improves lubrication
- Reduces Carbon
- Greatly decreases
- carbon monoxide gas
- and exhaust fumes

Sold on a Bonafide Guarantee of performance or your money refunded.

SOLE DISTRIBUTORS

MOORE-CHAPIN

—INCORPORATED—

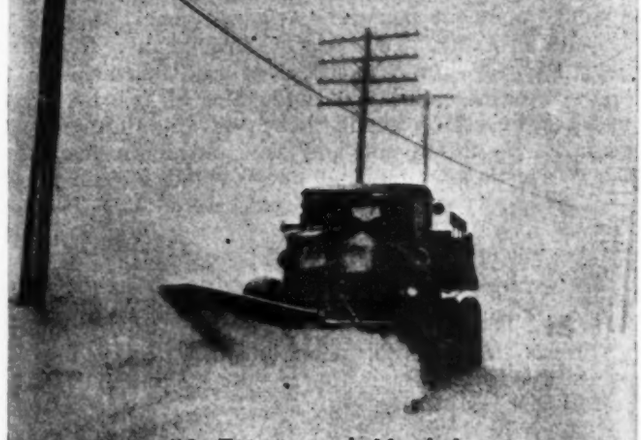
1061 Atlantic Ave. Brooklyn, N. Y.

Phone MAin 2-4313

Good Roads

CHAMPION

SNOW PLOWS



"A Type and Model for every purpose"

ASK FOR CATALOG AND HAND-BOOK NO. 100

GOOD ROADS MACHINERY CORP.

KENNETT SQUARE PENNSYLVANIA

A Full Crank-Case At All Times!

NOT Half-Full and Not Over-Full! The Consant level AUTOMATIC CRANKCASE OILER can be installed on any vehicle. . . . It insures a constant level of oil in the crankcase, continuously, and without attention of any kind.

THE use of this device removes the "human element" and eliminates the necessity of checking oil level on long road-trips. . . . Simple and absolutely fool-proof. No moving parts. Write for literature and find out for yourself what other fleet owners think of its merits. No obligation.

PRICES AND DISCOUNTS ON REQUEST

Used and endorsed by Greyhound Bus, John F. Jelke Co., United Trucking Service, Safeway Bus Lines, Cudahy Packing Co., De Luxe Bus Co., and many others.

MOTOR SERVICE & MFG. CO.
3301 Indiana Ave. Chicago, Ill.

Simplified Packaging for Bus Parts

SIMPLIFIED Practice Recommendation R161-35, Packaging of Automotive (Bus) Engine Parts, and Simplified Practice Recommendation R162-35, Packaging of Air Brake Parts, have been accorded the required degree of written approval and are effective from September 1, 1935, according to an announcement by the Division of Simplified Practice, National Bureau of Standards.

These recommendations, which were proposed by the American Transit Association through its Purchases and Stores Committee No. 2 on Standard Packages, list the number of units per package best suited for the requirements and convenience of the transit companies in storing, unit piling, inventorying and distributing parts for buses and electric railway cars. Attention is invited to the fact that manufacturers and distributors of parts may ship any number of standard packages in a shipping container.

The recommendation for packaging automotive (bus) engine parts covers 26 different items, such as intake and exhaust valves, pistons, connecting rods, bearings, etc.

The recommendation for packaging air brake materials covers 28 different compressor parts and 16 different governor parts, such as gears, pinions, bushings, carbon brushes, valves, etc.

Until printed copies are available, complimentary copies of these Simplified Practice Recommendations in mimeographed form may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

BETTER PERFORMANCE *for* **EVERY 1 to 3 TON TRUCK**

The Watson Overdrive-Underdrive Transmission is everywhere establishing unequalled performance records! It hauls heavier loads in quickest time, with least wear-and-tear and with surprising savings in gasoline and oil. An owner writes: "Made a 200 mile trip with a 1½ ton truck, equipped with your transmission, hauling 2000 gallons of gasoline and got the surprise of my life on performance."

TRIPLES THE GEAR RATIOS

WATSON COMPOUND TRANSMISSIONS

Write for Catalogue

H. S. WATSON CO.
525 - 4th St., San Francisco, Cal.

Built by BROWN-LIPE exclusively for H. S. WATSON CO.

The Best Buy for Every Lifting Need

SIMMONS
SILVER KING
HYDRAULIC JACKS

Send for Complete Catalog, without obligation
THE SIMMONS MFG. CO., Cleveland, O.

MODERN BODIES of FINEST CONSTRUCTION
THE GERSTENSLAGER CO. - - - Wooster, Ohio
75 YEARS OF BUILDING JUST GOOD BODIES — NOTHING ELSE
Write for list of satisfied owners

VELLUMOID

A QUALITY PRODUCT
Be sure you get VELLUMOID Sheet Packing and Gaskets, and not a substitute.
THE VELLUMOID CO., WORCESTER, MASS.

SHULER
TUBULAR TRAILER AXLES
FOR ECONOMY

With Shuler Tubular Axles you save on *replacements*. Strong heat-treated steel and conservative ratings provide an extra margin of safety.

You save on *maintenance* cost for the one piece seamless tubing requires no periodic adjustment.

You save on *tires*. For tubular construction cuts sag to a minimum. There is extra strength without increasing weight and wheels are kept in perfect alignment. Thus tire wear is minimized—wear on duals is equalized.

SHULER AXLE COMPANY, Inc
Louisville, Kentucky

ADVERTISERS INDEX:

Acheson Colloids Corp.	65
Aluminum Co. of Amer.	15
American Cable Co.	45
Automatic Electrical Devices Co.	—
Bendix Products Corp.	—
Blackhawk Mfg. Co.	66
Casco Products Corp.	71
Champion Spark Plug Co.	3
Chevrolet Motor Co.	37
Circo Products Co.	67
Cummins Engine Co.	72
Edison, Inc., Thos. A. (Edison Splitdorf Div.)	—
Electric Storage Battery Co.	21
Exide Batteries	21
Firestone Tire & Rubber Co.	—
Fleming Mfg. Co	49
Flower City Spec. Co.	66
Ford Motor Company	41
Four Wheel Drive Auto Co.	—
General Motors Truck Co.	9
General Tire & Rubber Co.	—
Gerstenslager Co.	73
Good Roads Machinery Corp.	72
Goodrich Rubber Co., B. F.	39
Guide Lamp Corp.	47
Hall Mfg. Co.	—
Hygienic Products Co.	72
International Harvester Co.	34A & 34B
Kingston Products Corp.	—
Latham Company, Inc.	68
Linde Air Products Co.	2nd Cover
Marmon-Herrington Co.	—
Milburn Co., Alex	70
Moore-Chapin, Inc.	72
Motor Service & Mfg. Co.	73
National Carbon Co.	31
Oakite Products Corp.	8
Oxweld Acetylene Co.	2nd Cover
Packard Electric Co.	7
Presto-O-Lite Co.	2nd Cover
Pyrene Mfg. Co.	6
Rega Mfg. Co.	70
Reo Motor Car Co.	—
Revolite Corp.	69
S.K.F. Industries, Inc.	—
Safety Signal Devices, Inc.	63
Scandinavia Belting Company	—
A. Schrader's Son Div. of Scovill Mfg. Co., Inc.	64
Service Recorder Co.	70
Sherwin-Williams Co.	43
Shuler Axle Co.	74
Simmons Mfg. Co.	73
Socony-Vacuum Oil Co.	18 & 19
Studebaker Corp.	4th Cover
Texas Company	4 & 5
Thompson Products Co.	3rd Cover
Timken-Detroit Axle Co.	—
Toledo Steel Products Co.	33
Trainor National Spring Co.	69
Turnsignal Corp.	68
Union Carbide Sales Co.	2nd Cover
Union Carbide & Carbon Co.	2nd Cover
United-American Bosch Corp.	12
United States Plywood Co.	68
Utility Trailer Mfg. Co.	66
Veeder-Root Inc.	—
Vellumoid Co.	73
Watson Co., H. S.	73
White Motor Co.	10 & 11

Increased Horse Power... Reduced Oil Consumption

30 TRUCKS and semi-trailers travel the highways for Boswell Bros. Motor Freight Co., Detroit. Loads are heavy —schedules are rigid—mileages are high.

Here's what Charles C. Boswell says about Thompson parts: "We are pleased to inform you of the satisfaction we have experienced in the use of your products, chiefly Pistons, Chrome Plated Pins Silcrome Valves and valve parts. We have had several reconditioned motors handled by your local jobber in which your process of tin plating cast iron pistons was used and we have been especially gratified with the results obtained principally due to increased horse power and reduced oil consumption."

THOMPSON PRODUCTS, INC. • CLEVELAND • DETROIT

Thompson Products

AEROTYPE VALVES

"S" AND "V" VALVES

GRAPHITED (SELF-LUBRICATING) VALVE GUIDES

DURACROME VALVE SEATS

VALVE SPRINGS AND RETAINERS

FACTORY DUPLICATE PISTONS

CHROME PLATED PISTON PINS

PACKLESS WATER PUMPS

PUMP PARTS

TRYON AND SILENT-U SHACKLES

HARRIS SHACKLE BUSHINGS

ECCENTRIC AND RUBBEROD TIE RODS

THOMPSON CHASSIS BOLTS

SELF-LUBRICATING OILITE BUSHINGS

•

First of its type in the LOWEST PRICE FIELD ! ! !

CAB forward! More pay-load space with shorter wheelbase! Easier handling—backing, parking, turning, loading! Better visibility, safer and handier in crowded quarters, shorter overall length for trailer use, easy for the driver to get in and out of *from either side! All* the important advantages which have cost two or three times as much, now brought to the lowest price field by Studebaker!

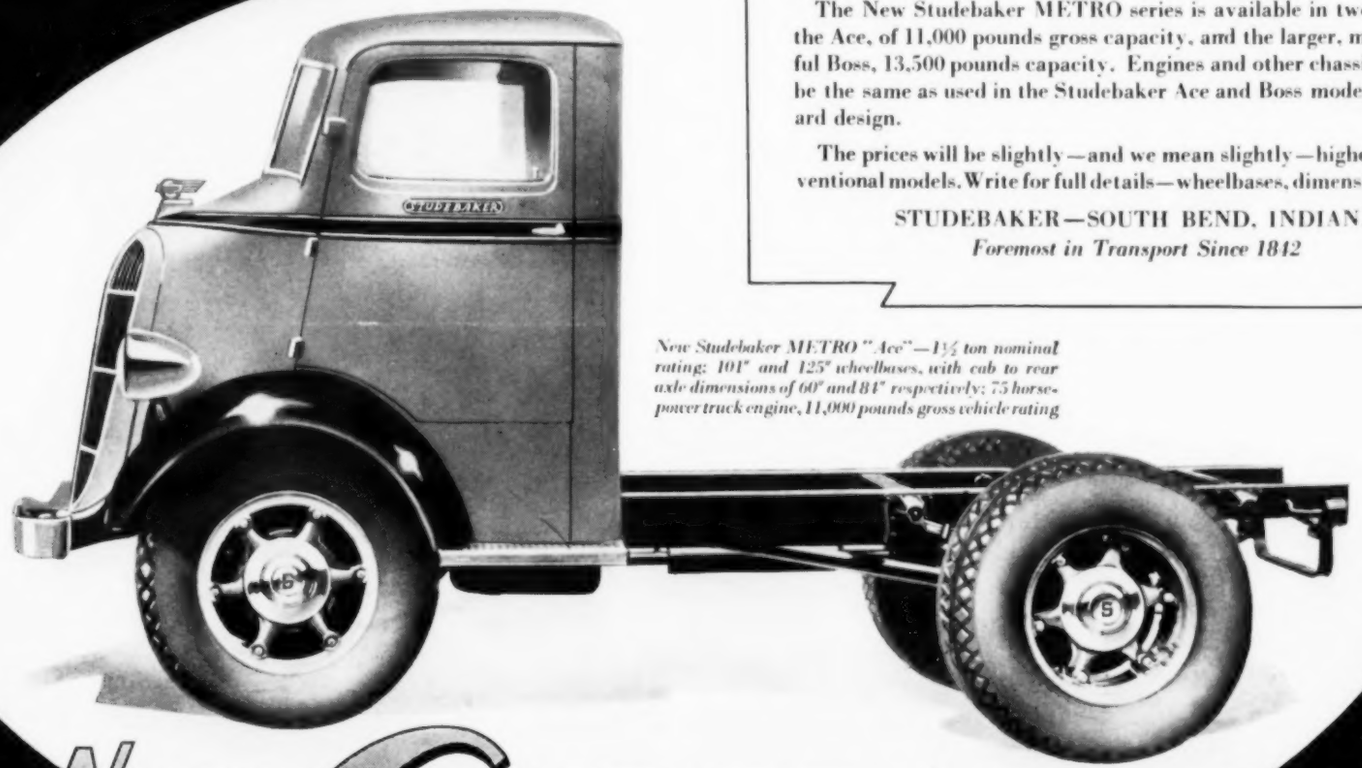
The market's waiting—eager—sure! And Studebaker, as usual, has met the need first with a factory-built chassis and cab.

The New Studebaker METRO series is available in two models—the Ace, of 11,000 pounds gross capacity, and the larger, more powerful Boss, 13,500 pounds capacity. Engines and other chassis units will be the same as used in the Studebaker Ace and Boss models of standard design.

The prices will be slightly—and we mean slightly—higher than conventional models. Write for full details—wheelbases, dimensions, prices.

STUDEBAKER—SOUTH BEND, INDIANA

Foremost in Transport Since 1842



New Studebaker METRO "Ace"—1½ ton nominal rating: 101" and 125" wheelbases, with cab to rear axle dimensions of 60" and 84" respectively; 75 horsepower truck engine, 11,000 pounds gross vehicle rating

The New STUDEBAKER METRO SERIES